

# Norwood's Epitomy:

BEING THE  
APPLICATION  
O. F.

## The Doctrine of TRIANGLES

In certain *Problems*, concerning the use of  
the *Plain Sea-Chart*, and *Mercators Chart*.

Being the two most usual kinds of *Sailing*.

With a Table of *Artificial Sines*, *Tan-*  
*gents*, and the *Complements Arithmetical*  
of *Sines* supplying the use of *Secants*.

To *Radii* 10,00000, and to every Degree  
and Minute of the Quadrant.

A L S O

A *Chiliad*, or the *Logarithms* of absolute Num-  
bers, from a Unit to 1000, with a Table of the Right  
Ascension and Declination of the Sun: and cer-  
tain principal Stars that are most in use.

Whereunto is added the farther use of the fore-  
named Tables in Questions that concern *Naviga-*  
*tion*, *Astronomy*, and *Geography*. As also an  
*Universal Almanack*.

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By Richard Norwood, Reader of the  
*MATHEMATICKS*.

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L O N D O N.

Printed by W. G. for G. Harlock, and are to  
be sold at his shop at St. Magnus Church,  
near London-Bridg. 1667.

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22

NEW METHOD OF  
APPLICATION

The Doctrine of TRIANGLE



696

By Richard Howwood, Reader of the  
MUSEUM BRITANICUM.

LONDON.

Printed by W. B. for C. Whittaker, and are to  
be sold at his Shop at St. Martin's Church,  
near Ludlow-Street, 1807.



## Norwood's Epitomie.

*Being the Application of the Doctrine of Triangles, in the two principal kinds of Sailing.*

**M**Y intent was here to have annexed a Treatise of Navigation, and especially of such points therein, as have reference to the whole *Doctrine of plain and Spherical Triangles*; But I have here shewed the resolution of all useful Problems, touching the two principal kinds of sailing by right-lined Triangles.

*Questions of sailing by the plain or ordinary Sea-Chart.*

Although the ground of the Projection of the ordinary Sea-Chart being false (as supposing the Earth and Sea to be a plain Superficies) and so the conclusions thence derived must also for the most part be erroneous; yet because it is most easie, and much used, and the errors in small distances not so evident, we will not wholly neglect it.

*Quest. 1.*

*Sailing 100 Leagues upon the sixth Rumb, how much shall I alter my Parallel or Latitude?*

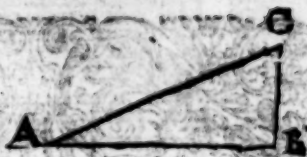
*Note.* The angle that any point of the Compass makes with the Meridian, we call the Rumb: but the angle that it makes with any Parallel, we call the complement of the Rumb.

And forasmuch as to every point of the compass there answers 11 deg. 15 min. therefore the sixth Rumb from the Meridian (namely, *Ene, Ene W. or W. W.*) makes an an-

## Problems of Sailing.

gle therewith of 67 deg 36 min. whose complement 22 deg. 30 min. is the angle of the same Rumb with every Parallel.

Now admit I sail from D to A Northeast 100 leagues. I demand the difference of Latitude BD.



*By the third Case of plain Triangles.*

As Radius

To the distance run,	AD 100 leagues,	2,00000
So sine complem. the Rumb.	A 22 deg. 30 min.	9,58184
To the difference of Latitude, DB	38 $\frac{2}{10}$ leagues,	1,58184

In like manner you may find the difference of Latitude, for any distance run upon any other point of the Compass.

2. *Sailing 100 leagues upon the sixth Rumb, How far am I departed from the Meridian of the place from which I came?*

That is by the same things given as before, I demand AB.

*By the third Case of plain Triangles.*

As Radius

To the distance run,	AD 100 leagues,	2,00000
So is the sine of the Rumb,	D 67 deg. 30 min.	9,95662
To the departure from the Merid.	AB 92 $\frac{2}{10}$ leagues,	1,95662

3. *Sailing upon the sixth Rumb, till I alter my Latitude one degree: I demand how far I have sailed?*

As sailing from D to A, East Northeast, till the difference of Latitude DB be 10 leagues, I demand the distance run AD.

*Say by the second Case of plain Triangles.*

As sine complem. the rumb,	A 22 d. 30 min. or.	0,41716
To the difference of Latitude DB	10 leagues,	1,30703
So is Radius		
To the distance run AD	52 $\frac{2}{10}$ leagues,	1,71819

The like question might be moved by the departure from the Meridian given.

by the plain Sea-Chart.

3.

4. Sailing upon the sixth Rumb, till I have altered my Latitude one degree; how much am I departed from my first Meridian?

As sailing from D to A, East Northeast, till the difference of Latitude D B be 20 leagues, I demand A B, my departure from the Meridian, (as for example in the former type.)

By the first Case of plain Triangles.

As Radius

To the difference of Latitude, D B, 20 leagues, 1,30103

So is the tangent of the Rumb, D 67 deg. 30 min 10,38178

To the departure from the Merid. A B 48  $\frac{3}{10}$  leagues, 1,68381

In like manner by the departure from the Meridian given, you may find the difference of Latitude.

5. Sailing upon some Rumb, between the North and the East 52  $\frac{3}{10}$  leagues, and finding that I have altered my

Latitude one degree: I demand upon what point I have sailed?

As if I sail from D to A, (being some Rumb between the East and North) 52  $\frac{3}{10}$  leagues; and then find the difference of

Latitude D B to be 20 leagues; I demand the angle A D B.

Say by the first case.

As the Distance run, D A 52  $\frac{3}{10}$  leagues, ca. ar. 3,18192

Is to Radius:

So is the difference of Latitude, D B 20 leagues, 1,30103

To the complement the Rumb, A, 22 deg. 30 min 9,58194

Whose complement D, 67 deg. 30 min. is the sixth point from the Meridian, namely, East Northeast. Here we neglect some part of a minute (as in these things not to be regarded) and so in other places

6. Sailing upon some Rumb between the North and the East, 52  $\frac{3}{10}$  leagues, and finding that I have altered my

Latitude one degree: I would know my departure from my first meridian.

A 3

By

# Problems of Sailing

## By the seventh Case.

To the distance run, add the difference of Latitude, and also substract it from the said Distance, noting the Sum and Remainder. Then add together the Logarithms of this Sum and Remainder, and half that Total is the Logarithm of the distance from the first Meridian.

Distance run  $DA$ , 72  $\frac{3}{10}$  leag. } Summ 72  $\frac{3}{10}$  leag. 1,85384

Differ. of latid.  $DD$ , 20 leag. } Remain. 32  $\frac{3}{10}$  leag. 1,50853

3,36237

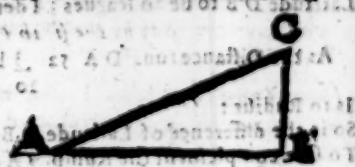
Departure from the Meridian  $AB$ , 48  $\frac{3}{10}$  leagues. 2,48368

The same may be otherwise found by the same case. And in like sort might the difference of latitude be found, the departure from the Meridian being known.

7. The distance of the Meridians of two places, and the difference of the Latitudes of the same places being given, to find the Rumb and distance.

As let  $A$  represent the Lizard in the West part of England, and  $AB$  the Parallel thereof, and let  $D$  represent St. Maries Island being one of the Azores,  $DB$  the Meridian thereof.

Then is  $AB$  the distance of the Lizard from the Meridian of St. Maries, which let be 222 leagues; and  $AB$  the distance of their parallels, or difference of their Latitudes 256 leagues, I demand the Rumb, namely, the angle at  $D$ , and the distance in the Rumb  $AD$ .



First for the rumb, say by the fourth case.

As the difference of Latitude.  $DB$  256 leagues, as ar. 7, 19176 Is in proportion to Radius:

So is the distance of the Meridian  $AB$ , 222 leagues, 2,43457

To the tangent of the rumb:  $D$ , 46 deg. 44 min. 10,02633

Which is the fourth Rumb from the Meridian, and 1 degree 44 min. more; which shews the course from St. Maries to the Lizard

by the plain Sea-Chart.

5

Lizard to be Northeast, 1 degree 44 min. Easterly: or from the Lizard to St. Marys Southwest, 1 deg. 44 min. Westerly. And thus it should be by the plain Chart.

Secondly, for the distance A D, say by the 2 case.

As the sine of the Rumb,  $\angle D$  46 deg. 44 minutes,  $\text{is ar. } 0,13776$

To the distance of the Meridians A B, 272 leagues.  $2,43457$

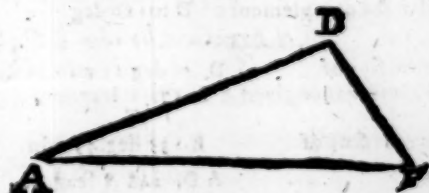
So is the Radius.

To the distance of the places A D,  $373 \frac{1}{2}$  leagues,  $2,57133$

And such should be the distance by the plain Chart.

8. *Sailing away W S W, I see a point of Land, which I set, and find to bear from me West by North, and having sailed six leagues further, I find it bears from me Northwest by West: I would know how far it is distant.*

As let E be a point of land, which when the ship is at A, I set and find to bear from West by North, but I hold on my course from A to D



West South West 3 miles, and at D, I set the same point of Land again, and find it to bear from me Northwest by West: I demand the distance thereof D E, that is, how far it was from me in my last observation?

First, I consider between A E, the West by North, and A D the West South west, is three Points of the Compass, that is, 32 degrees 45 min. which is the angle at A: also between E A, the East by South, and E D the South-east by East are two Points, that is, 22 degrees 30 minutes.

Therefore by the 8th. Case of plain Triangles.

As sine the angle at the point seen,  $\angle E$  22 d. 30 m.  $\text{is ar. } 0,41716$

Is to the distance run,

A D 18 miles,  $1,25527$

So sine the angle at the first place of observation,  $\angle A$  33 degrees 45 min.  $9,74174$

To the distance of the point seen, E D  $26 \frac{1}{10}$  miles,  $1,41774$

Whereby it appears, that the distance of the point seen from the place of your last observation is 2 6 miles, and a furlong. In like manner you may find the distance thereof from the place of your first observation A.

Admit the course from the Lizard to S. Maries be S W the distance  $373 \frac{1}{2}$  leagues. A certain ship bound from the Lizard to S. Maries, steers away S S W, and afterwards W by S, and so sometimes upon one of those points, sometimes upon the other, till she arrives at S. Maries; now I demand how many leagues she hath sayled upon one of these points, and how many upon the other?

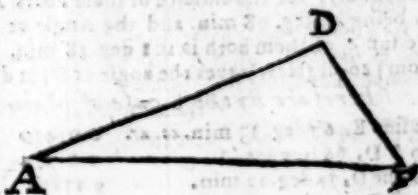
Let A be the Lizard, E, S. Maries, and seeing  $sw$ , being from Southwest two points, makes an angle therewith of 22 deg. 30 min. which let be A; Also West by South makes with  $sw$  an Angle of 33 deg. 45 min. which let be E, also South  $sw$ , makes with West by South an angle of 36 deg. 15 min. which let be the complement of D to 180 deg.

I heretofore by the 8 Case.

As the sine of	D, 56 deg. 15 min. <i>com. ar.</i>	0.88045
To the distance given A E, 373 $\frac{1}{2}$ leagues,		2,55113
So is the sine of	E, 33 deg. 45 min.	7.74174
To	A D, 148 $\frac{9}{10}$ leagues,	2,19602

rectly as he can, and after two days meets with a Man of War, who also had been the day before in the Latitude of 43 deg. and had sailed thence SE by S 37 leagues. He desires to find those Pirates, the Merchant-man tells them, he left them lying so and fro where they took him, and he had sailed since at least 64 leagues, between the South and west: what course shall the Man of War shape to find these Pirates?

Let A E be the Parallel of 43 deg. D the place where the ships meet: then is there given AD 64 leagues, E D 37 leagues, and the angle DEA five points or 56 deg. 15 min.



Therefore by the 9 Case of plain triangles.

As the distance run by A D 64 leagues, co. ar. 8,19312

the Merchant man, 1

To find the angle given, s E, 56 deg. 15 min. 9,91283

So is the distance run by the Man of War } E D, 37 leagues. 1,16120

To find an angle required, s A, 23 deg. 44 min. 9,68187

This is V West South west, 6 deg 14 min Southerly, and so hath the Merchant sailed; therefore to return to the same place he must shape his course East Northeast, 6 deg 14 min. Northerly.

11. There are two Ports lying NE, and NW, one off another, a ship sails from the Westermost of these Ports East Southeast 47 leagues, another departing from the Eastermost Port sails 66 leagues, and then meets with the former, what course hath this second ship kept; and how far are these Ports asunder? Let

Let the Northeast Port be A, the Southeast E, and the place where these Ships meet at D, And forasmuch as from E to A, the course is Northeast, and from E to D East Southeast, therefore the angle at E, is 67 degrees 30 min. and the side E D, 47 leagues, and A D 66 leagues.

*Therefore by the 9 case of plain triangles.*

And seeing from A 10  
As A D 66 leagues, *ca. ar.* 8,18046 E, the course is South-  
To find E, 67 deg. 30 min. 9,96361 West, and from A to D  
So E D 47 leagues 1,67210 41 d. 08 m. more Sou-  
To find A, 41 deg. 08 min. 9,81817 therly: therefore the  
course from A to D, is South 3 deg. 52 min. Westerly.

Secondly, for the distance of these Ports A E, the Angle at A, being 47 deg. 08 min. and the Angle at E 67 deg. 30 min. the sum of them both is 108 deg. 38 min. which subtracted from 180 Degrees, leaves the angle at D, 71 deg. 22 min.

*Therefore by the 8 case of plain triangles.*

As sine E, 67 deg. 30 min. *ca. ar.* 0,93439 So that the di-  
To A D, 66 leagues, 1,81974 stance between  
To find D, 71 deg. 22 min. 9,97662 the two Ports is  
To A E, 67  $\frac{1}{2}$  leagues, 1,83055 67  $\frac{1}{2}$  leagues.  
10 10

Some may think it require, that the latter part of this Problem should have been a distinct case in plain Triangles; but because the same things are here given as in the 9 Case, and the operation manifest by the Eighth and Ninth, I thought it not necessary to make another Case of it.

12. *Coasting along towards the evening, I have sight of a Cape or Headland, beyond which I desire to steer in, the next morning it bears from me S S E, and is distant by estimation 11 leagues, but I steer away South till two of the clock in the morning about 12 leagues; and then would know how the Cape bears from me, & how far it is off.*

As admit A, I observe the Cape D to bear from the South Southeast 11 leaves; but I steer away South, to E 12 leagues. I have then A D 11 leagues. A E 12 leagues, the angle at A 22 deg. 30 min (as for example) in the foregoing type.

*Firß,*

First, then for the angle at E by the 10 Case.

To  $\angle E$   $\angle D$   $\angle A$   $\angle D$  23 leagues, com. ar. 8, 0328

To  $\angle E$   $\angle D$ , 01 league. 10, 76134

So  $\frac{1}{2} \angle D$  78 degrees 45 minutes. 9, 33062

To tang. an angle F. 12 degrees 20 minutes.

Which subtracted  $\angle E$ . 66 degrees 25 min.  
there remains 3

In working this example: because the angle given  $\angle A$ , is 12 deg 30 min. therefore the other two  $\angle E$  and  $\angle D$ , are 157 deg. 30 min (by the first Lemma of the third Chapter of plain triangles) the half whereof is 78 deg 45 min. Whereby we find an angle F, 12 deg. 20 min. which subtracted from 78 deg. 45 min. there remains the angle at E, 66 deg. 25 min. Wherefore seeing  $EA$  is a North line,  $ED$  is almost East Northeast, namely, East Northeast 1 deg. 5 min. Northerly.

Secondly, for the distance of the Cape  $ED$ , by the 8 Case.

A fine the angle found,  $\angle E$  66 d. 25 m. ar. 0, 03788

To the distance in the evening  $\angle A$   $\angle D$  11 leagues: 1, 04139

So the fine of the angle given,  $\angle A$  23 d. 30 min. 9, 50284

To the distance in the morning.  $ED$  4  $\frac{6}{10}$  leagues. 066211

That is above 4 leagues and a half distant.

13. Admit I sail away from a certain Port  $SSW$  50 leagues, and thence again  $W$  by  $S$  30 leagues, upon what point have I made my way good, and how far am I come for a Port?

As admit I sail from  $A$  to  $D$  South Southwest 50 leagues, and from  $D$  to  $E$ , West by South 30 leagues. there is required the course  $A$ , or  $E$ , and  $AE$ .

From the South Southwest to the West by South are 5 points, that is 56 deg. 15 min. which is the complement of the angle at  $D$ , to 180 deg. So that the angle at  $D$  is 123 deg. 45 min. Wherefore here are given the two sides  $AD$ , and  $ED$ , and their contained angle at  $D$ ; Therefore --

As  $A D \perp ED$ , 80 leagues, 2,09691  
 To  $A D \perp ED$  30 leagues, 1,30103  
 So  $\angle A \perp E$  23 degrees 08 min. 9,72810

To  $\angle F$ , 07 degrees, 37 min. 9,11004

VVhich subtracted }  $A$  20 degrees 31 min.  
 there remains }

VVherefore seeing the course from  $A$  to  $D$ , is South South-west, the course from  $A$  to  $E$  is 20 degrees 31 min more Westerly, that is Southwest, 2 deg. Southerly; so that I have made my way good Southwest two degrees Southerly.

*Secondly, for the distance upon that Point.*

As sine the angle found,  $\angle A$  20 degrees 31 min. 0,45534

To his opposite side given,  $ED$ , 30 leagues, 1,47712

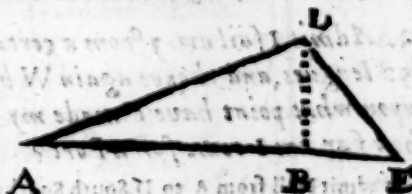
So sine the angle given,  $\angle D$ , 56 degrees 15 min. 9,91983

To his opposite side required,  $AE$ , 71  $\frac{1}{10}$  leagues, 1,35131

Which is the distance from that Port,

14. There are two Ports in one and the same Parallel, or Latitude, distant 64 leagues, and there is a certain Island more Southerly, distant from the Eastermost of these Ports 47 leagues, and from the Westermost of them 34 leagues: I demand the course from the Eastermost Port to that Island?

Let the Eastermost port be  $A$  the VVestermost  $E$ , both in one and the same Parallel  $AE$ , distant 64 leagues, and let the island be  $D$ , distant from



$A$ , 47 leagues, and from  $E$  34 leagues; there is required, the course from  $A$  to  $D$ , that is, the angle at  $A$ , or the complement thereof.

*By the 12 case of plain Triangles.*

As the distance of the parts  $AE$ , 64 leagues, 3,19982

To

## by Mercators Chart.

11

the sum of A D, and E D, 31 leagues,		1,9848
is the difference of A D, and E D, 13 leagues,		1,1194
a certain line	A, 16 454	1,31624
	1000	
which is added to A E, is	80 454	
	1000	
The half whereof is	A E. 40 227	
	1000	

### Then by the 6 case of plain triangles,

As A D 47 leagues,	compl. arch.	8.32790
o Radius ;		
o A B, 40 227		1,60412
	1000	

o s c A, s 58 degrees 51 min. 9.93242  
 That is South-west and by West, 2 deg 36 min. Westerly.  
 which is the course from the Eastermost port to the Island.

5. A ship sails from one Port to a second S S E  
 76 leagues, and from thence to a third 34 leagues,  
 and from that third to the first 85 league: I de-  
 mand the course from the second Port to the  
 third, and from the third to the first ?

This and the like are to be wrought as the former, which  
 therefore we leave to your own practise.

## Of Sayling by Mercators Chart.

And thus much of the plain Chart, which as it hath this  
 Commodity, that it is most easie ; so it hath some dis-  
 commodity intolerable. For there be very few places that can  
 herein be expressed, according to the true Situation and di-  
 stance one from another. Which as it is a great impediment in  
 the practice of Navigation, so it hath caused much confusi-  
 on in the Geographical, and Hydrographical descriptions of  
 places ; Inasmuch as there are scarce extant any Descriptions  
 of the World or the parts thereof, that are not pestred with no-  
 rious Errours, the greatest part of them hence arising. It is in-  
 deed ancient, and till the Sea Compass was known, it was  
 the simplest Chart that could be used ; because till then, men  
 were

were Coasters, and for the most part returned back the same way they went forth, and it may still serve without any great Errour in such places as are near the Equinoctial, also in many other places for short Voyages, and even for long Voyages, provided that a man be sure to return the same way that he went, or near the same, Otherwise, if he trust to the plain Chart, he will be most grossly deceived many times in his course a point or two of his Compass, and in his Distance many hundred miles. But in this Sea-Chart called *Mercators*, all or any parts of the World may be set down, according to their Longitudes, Latitudes, Courses and Distances, as truly and far more conveniently for the Mariners use, then upon the Globe it self: So that it will truly shew the direction and distance from place to place, which way soever a man goes or returns.

Somemen will say, that in divers reckonings by *Mercators* Chart, they have found as little certainty, as by the plain Chart. VVhich I deny not, but the reason is, because there are few or no Charts made directly according to this Projection. It will be said, Yes, there be many; and that a man may have of them whensoever he will bespeak them. I grant a man may have those which are so called, but that which is such indeed, must not onely have the Meridians, Parallels, and Rumbes drawn according to this Projection; but the Sea-coasts must be inserted by the like Art and means as they have formerly been inserted into the common Sea-Chart: otherwise, he that shall transfer places out of the common Sea Chart into *Mercators*, without due knowledge and respect upon what occasion or for what reason they were so placed in the common Sea Chart; he shall transfer the Errors of the one into the other. And that sometimes with increase. VVherefore it requires more then an ordinary judgment, to draw a Plot directly according to this Projection, for any place or places; and he must further know, or be made acquainted with the reckonings of Mariners frequenting those places; and that truly whether with allowance or without, and whether agreeing or disagreeing with their plots, and so comparing one thing with another, and weighing all in the balance of a good judgment, he shall be able to do it. The ground of the Projection of this kind of Charts was pointed at by *Tolomy*, many hundred years since; and according to that ground, *Mercator* did of late years set forth an universal Map of the World: where

on these have been called *Mercators Charts*. But the way  
to describe them was first taught by that learned Naviga-  
tor of our times, Mr. *Edward Wright*, in his Book of the *Cor-  
rection of Errors in Navigation*. From whence also the grounds  
and reasons of these ensuing Problems are to be taken: and  
we would be as grateful to our own Country-men as to  
strangers, I see not but we may ascribe as much to him in  
this, as to any other man. Now that which he hath shewed  
to perform by the Chart it self, we will here shew to work by  
the Doctrine of plain Triangles, using the help of the Table  
of *Logarithm Tangents*, beginning at 45 degrees 00 minutes, and  
increasing upwards, accounting every 30 min. to be one  
degree of the Meridian line, as the Tangent of 45 degrees  
00 min. to be one deg. of the Meridian line, the Tangent of 46  
deg. 00 min. to be two deg. 00 minutes of the Meridian line,  
and so forwards, so that every minute is two minutes of the  
Meridian line; and although that these be not the same Meri-  
dional parts that are in the Doctrine of Triangles, yet they  
proceed in the same proportion as the *Secants* added together  
do, and shall produce the same solution to every Problem  
of Sailing by *Mercators Chart*, as the other Tables do; but be-  
cause in this small Volume we have but one *Table* of 1000  
*Logarithms*, I shall work by Leagues, and not by miles, or mi-  
nutes; yet I shall resolve the same Problems of Sailing by *Mer-  
cators Charts*, that are set down in the Doctrine of Triangles.

**Prob. 1.** *To find by these Tables what Meridional  
Leagues are contained in any difference of Latitude.*

**T**O perform this Problem, we must take half of each of the  
given Latitudes, and to each half add 45 degrees 00 min.  
and the Sum shall shew us the degrees and minutes, where we  
shall find the Tangent to give us the Meridional leagues from  
the Equinoctial to each latitude, but it shall suffice us to subtract  
the lesser tangent out of the greater, and to multiply the dif-  
ference or remainder by 10, and to divide that Product by  
76, and the quotient shall be the meridional leagues contain-  
ed between the two Latitudes.

**As** Let one Latitude be 50 deg. 00 min. the other 32 deg. 35  
min. The half of 50 deg. 00 min. is 25 deg. 00 min, to which  
add 45. deg. 00 min. the Sum is 70 d. 00 min. which are 4599.  
The half of 32 deg. 35 min. is 16 deg. 17 min. and an half.

to which add 45 deg. 00 min. the Summ is 61 deg. 17 min.

where we must look the equal parts, viz. at the Tangent 61 deg. 17 min and a half, which are 26147. Which subtracted from 43895, and the remainder is 17748, which multiplied by 10, is 177480, and that divided by 376, the quotient is 47 leagues nearest, which are the meridional leagues contained between the two Latitudes, and the like is to be done for all Latitudes whatsoever.

Now although this way doth a little differ from that was done by Meridional parts; yet the difference is of no validity to breed any considerable error in the course, and so by consequence not in the distance; and therefore I desire a favourable construction of it.

Prob 2. *The Latitudes, and difference of Longitude of two places given; to find the rumb and distance?*

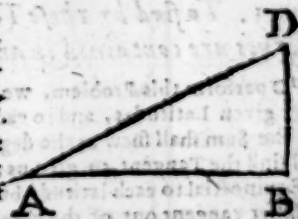
**T**O the intent the application may be the more evident, we will give examples of two places expressed in the Chart.

As admit the Latitude of the Lizard to be 50 deg. 00 min. the latitude of Summer Islands, sometimes called the *Bermudas* 32 d. 15 min. and the difference of Longitude to be 70 deg. 00 min. the Summer-Islands being so much to the Westward of the Lizard. I demand the course, & the distance from the one to the other.

As in this right angled Triangle ADB. Let A represent the Lizard and AB the Parallel thereof, D Summer-Islands, and DB the Meridian thereof.

Then is there given DB the difference of Latitude 17 d. 35 min. and AB the difference of Longitude 70 deg. 00 minutes.

whereby the angles and Hypothenuzal should be found by the fourth and second Cases of plain Triangles. But because in this kind of Projection, the degrees of Longitude and Latitude are not equal; (except in places near the Equinoctial) the degrees of Latitude, at every Parallel, exceeding the degrees of Longitude, in such proportion as the Equinoctial exceeds that parallel; therefore these differences of Longitude & Latitude, must first be expressed by some one common measure.



sure. And for that purpose serves the Table of Tangents, while it sheweth how many equal leagues are from the Equinoctial to every degree of latitude: namely, of such equal leagues as a degree of Longitude doth contain 20.

Wherefore multiplying 70 deg. 00 min. the difference of Longitude by 20 I have 140 for the Meridional leagues contained in the difference of Longitude; also (by the last Problem) I find the meridional leagues contained in the difference of Latitude to be 472. so that D B is 472 leagues, and A B 1400 such leagues.

*Therefore by the 4 Case of plain triangles.*

As the differ. of latit. in leagues D B 472 *co. arith.* 731608  
Is in proportion to Radius.

So is the differ. of Longitude in leagues A B 1400. 314612

To the tangent of the rumb,  $\angle$  D 71 deg. 21 min. 2047118

Which sheweth the course from the Summer-Islands to the Lizard to be East Northeast 3 d. 52 m. Easterly. or, from the Lizard to the Summer-Islands. W S W, 1 deg. 61 min. Westerly.

*Secondly, for the distance in the Rumb.*

Reduce the difference of Latitude into leagues (multiplying the degrees by 20) and to the Product adding one third of the minutes.

*Then by the 2 Case of plain triangles.*

As sine compl. the Rumb  $\angle$  A, 18 deg 39. min. *co. ar.* 649514  
To the difference of Latitude D B, 472 leagues. 254654

To the distance A D 1100 leagues, 304168

And this is the distance measured in the Rumb; there is a nearer cut between these two places, whereof we shall speak hereafter in *Great Circle sailing*, which is by Segments of several Rumbs often changing the course, but here whensoever we speak of the distance of two places, we mean their distance measured in their Rumb.

**Prop. 3.** *The Latitude of two places, and their distance given: to find the Rumb, and difference of Longitude.*

**A** Dmit I sail from the Lizard, being in the Latitude of 50 degrees, upon some point to the Westward 1100 leagues, &

**B**

*then*

then find my self in the Latitude of 32 deg. 25 min. I would know upon what point I have made my way good; and how much I have altered my Longitude.

The difference of Latitude D B, is 17 deg. 35 min. which reduced into Leagues, is 352 leagues. (As in the foregoing type)

As the distance sailed A D, 1100 leagues, co. ar. 695832  
Is in proportion to Radius :

So is the difference of latitude D B. 352 leagues 254614

To find complement the Rumb : A. 18 deg. 39 min. 930486

That is West Southwest 3 deg. 51 min. Westerly.

*Secondly, for the difference of Longitude.*

Find by the first Problem what Meridional leagues are contained in the difference of latitude, which are here 472, then say,

As Radius

To the difference of latitude in leagues, D B. 472. 267394

So is the tangent of the Rumb. : D. 71 deg. 21 min. 47218

To the difference of longitude in leagues, A B. 1400 314612

Which leagues reduced into degrees, dividing them by 20, the quotient is 70 deg. the difference of Longitude required.

*Prob. 4. By the Rumb, and Latitudes of two places given, to find their distance, and difference of Longitude.*

**A**dmit I sail from the Lizard, being in the Latitude of 50 deg. West South West 3 deg. 51 min. Westerly, till I find my self in the Latitude of 32 deg. 25 min : I demand how far I have sailed, and how much I have altered my Longitude?

The distance is found as in the latter part of the second Problem thus. The difference of Latitude converted into leagues is 352. Say then,

A. fine complem. the rumb. : A 18 deg. 39 min. 0.49514

To the difference of Latitude D B 352 leagues, 251654

So is Radius.

To the distance A D, 1100 leagues, 304168

And so much is the distance ; the difference of Longitude may be found as in the latter part of the 3 Problem, saying,

As Radius, to the difference of Latitude in meridional leagues, so is the tangent of the Rumb, to the difference of Longitude in Leagues,

Prob.

ob. 5. By the difference of Longitude, Rumb, and one Longitude : to find the other Latitude and the distance ?

Suppose I sail from the Lizard, being in the Latitude of 50 deg. West Southwest 3 deg. Westerly, till I have altered my Longitude 75 deg. how much have I laid the Pole, and how far am I from the Lizard ?

Reduce the difference of Longitude into Leagues by 20, and it makes 1400 ; then say,

As the tangent of the Rumb  $\text{D } 71 \text{ d. } 21 \text{ m. co. ar.}$   $9.51829$   
 To the difference of Longitude in leagues, A B. 1400.  $314162$

is Radius

the difference of Latitude in leagues, D B. 472  $267441$

Which 472 leagues multiplied by 376, and the Product 472, and that divide by 10, and the quotient is 17747.

Which I subtract from the equal parts of the Latitude of 50

00 min. which we found by the Problem to be at the tan-

gent of 70 deg. 00 min. viz. 41893. and the remainder is

46, which I seek in the tangents. and find it in the tan-

gent of 61 deg. 17 min. and a half, from which I subtract 45

00 min. and the remainder is 16 deg. 17 min. and a half.

Which being doubled, is 32 deg 33 min. The latitude of the

place to which I am come.

*Secondly, for the Distance.*

Having already the Rumb, and difference of Latitude, it

may be found as in the second and fourth Problems ; saying,

As sine compl. the rumb,  $\text{A } 18 \text{ d } 39 \text{ m. co. ar.}$   $0.49514$

To the difference of Latitude, D B 352 leagues,  $254654$

is Radius,

the distance, A D 1100 leagues,  $804163$

ob. 6. By the Rumb, the distance, and one Latitude given : to find the other Latitude, and the difference of Longitude ?

Suppose I sail VVest Southwest 3 deg. 51 min. VVesterly, 1100 leagues. and then find my self in the Latitude of 32 deg. 00 min. I demand the Latitude of the place from which I came, and the difference of Longitude between that and this ?

B 2

First,

*First, for the difference of Latitude.*

As Radius.

To the distance run A D 1100 leagues, 30416

So sine compl. the rumb A, 18 deg 39 min. 95748

To the difference of Latitude, D B 352 leagues, 25468

Which 352 leagues converted into deg. is 17 deg 33 minute  
the difference of latitude required; which added to 32 deg. 3  
min. makes 50 deg. 00 min. the latitude of the first place.

The difference of Longitude is found as before in the third  
Problem; saying,

As Radius to the differ. in Latitude in Meridional leagues  
so is the tangent of the rumb, to the difference of Longitude in  
leagues.

And thus the difference of Longitude will be found as in this  
example to be 70 deg. 00 min.

If at any time you desire to convert this difference of Longitude  
found in any Parallel into leagues, you may do it after  
this Example.

*7. Admit there be two places both in the Parallel of 50 degrees, which differ in Longitude 70 degrees 00 minutes: I demand the distance of these two places?*

First, it is to be understood that the leagues of Longitude in  
any Parallel, are not in proportion to the distance in leagues  
as the Equinoctial is to that Parallel, or as the semidiameter of  
the one, is to the semidiameter of the other.

That is,

As Radius is in proportion,

To sine compl. the latitude, 50 deg. 00 min. 98080

So is difference of longitude, 1400 leagues, 31461

To the distance in that parallel, 900 leagues, 29541

*Table for the angles which every Rumb  
maketh with the Meridian.*

North	South	D.	M.	South	North	
		02	49			
		05	38			
		08	26			
N by E	S by E	11	15	S by W	N by W	1
		14	04			
		16	53			
N E	S S E	19	41	S S W	NNW	2
		22	30			
		25	19			
		28	08			
E by N	S E by S	30	56	SW by S	NW by N	3
		33	45			
		36	34			
		39	23			
N E	S E	42	11	S W	N W	4
		45	00			
		47	49			
		50	37			
		53	26			
N E by E	S E by E	56	15	SW by W	NW by W	5
		59	04			
		61	52			
E N E	E S E	64	41	WSW	WNW	6
		67	20			
		70	19			
		73	07			
E by N	E by S	75	56	W by S	W by N	7
		78	45			
		81	34			
		84	22			
		87	11			
East	East	90	00	West	West	8



Propositions in **ASTRONOMY** and  
**NAVIGATION**, performed by the  
 Tables of Artificial *Sines, Tan-*  
*gents, and Logarithms.*

Prop. 1. *The Suns place being known, to find his Declination.*

**A**S Radius to, the sine of greatest declination, 23 deg. 30 min. so is the sine of the Suns distance from the next Equinoctial point, to the sine of his present declination.  
 So the Sun being in 20 deg. 36 minutes of *Taurus*, his declination will be found to be 17 deg. 58 min. almost.

Prop. 2. *The Suns declination being given, to find his place in the Zodiac.*

**A**S the sine of the greatest declination is to Radius, so is the present declination to the present place.  
 So the Sun having 17 deg. 58 min. of North declination, his place will be found to be in 20 deg. 36 min. of *Taurus*, or 24 minutes.

Prop. 3. *The Latitude of the place, and declination of the Sun given, to find his Amplitude.*

**A**S the Co-sine of the Latitude is to Radius, so the sine of the declination, to the sine of the amplitude.

So the Sun having 11 d. 48 m. of North declination, his amplitude will be found to be 19 d. 15 m. North also: For this is general, that if the Sun be in Northern Signes, as in *Aries*, *Taurus*, *Gemini*, *Cancer*, *Leo*, *Virgo*, he hath North declination, and North amplitude. And if in Southern Signes, as in *Libra*, *Scorpio*, *Sagittarius*, *Capricorn*, *Pisces*, or *Aquarius*, South declination, and South amplitude.

Prop. 4. *The Suns declination and amplitude given, to find the height of the Pole.*

**A**s the sine of the amplitude, to the sine of the declination; so Radius to the Co-sine of the latitude.

So the declination being 11 deg. 43. min. and the amplitude 19 deg. 7 min. the height of the Equinoctial will be found to be 38 deg. 19 min. whose complement 51 deg. 41 min. is the height of the Pole.

Prop. 5. *The latitude of the place, and declination of the Sun given, to find his right Ascension.*

**A**s Radius to the tangent of the Suns distance from the next Equinoctial point, so is the Co-sine of the greatest declination to the tangent of the right ascension.

So the Sun being in 20 deg. of *Taurus* (that is 50 deg. from the next Equinoctial point *Aries*) his right ascension will be found to be 47 deg. 32 min.

Prop. 6. *The latitude of the place, and declination of the Sun given, to find the ascensional difference, which is the time of the Suns rising or setting.*

**A**s the Co-tangent of the latitude, to the tangent of the declination; so is Radius to the sine of the ascensional difference.

So the latitude being 51 deg. 30 min. North, and the declination

nation 20 deg. the difference of Ascension will be found to be 27 deg 14 min. which reduced into time (by allowing 15 deg. for one hour, and four minutes of time for one degree) doth give one hour, and almost 49 min. for the difference between the Suns rising or setting, before or after the hour of six, according to the time of the year, that is, when the Sun is in Northern signs the Sun rises before, and sets after six, and in Southern signs he rises after, and sets before six.

*Prop. 7. The amplitude, and difference of ascension of the Sun, or Star given, to find his declination.*

**A**S the sine of the ascensional difference is to the Co sine of the amplitude, so is the Radius to the Co-sine of the declination.

So the ascensional difference being 27 deg. 34 min. shews the Sun rises at 4 a clock and 10 min. which converted into degrees makes 61 degrees 30 min. and the amplitude 33 deg. 38 min.

The declination will be found to be 20 deg. 10 min.

*Prop. 8. The Latitude and declination given, to find the Meridian altitude.*

**I**F the Sun have North declination, and the complement of the latitude to the declination, the Sum is the Meridian altitude: But if the Sun have South declination, subtract the declination from the complement of the latitude, the residue is the Meridian altitude.

So the latitude being 51 deg. 46 min. the complement thereof is 38 deg. 20 min. and let the declination be 23 deg. 30 min. North: Add 38 deg. 20 min. to 23 deg. 30 min, the Sum is 61 deg. 50 min. the Meridian altitude. But if the declination had been 23 deg. 30 min. South, subtract 23 deg. 30 min. from 38 deg. 20 min. the remain would be 14 deg. 50 min. for the Meridian altitude.

*Prop.*

**Prop. 4.** *The latitude and declination known to find the height of the Sun at any hour.*

**A**s the Co-sine of the hour from the Meridian is to Radius, so the tangent of the latitude, to the tangent of a fourth ark.

So in the latitude of of 51 deg. 30 min. and one hour from the Meridian, (which is either 11 or 1 a clock) this fourth ark will be found to be 32 deg. 28 min.

Then consider the declination of the Sun. and the hour proposed, if the latitude and declination be alike, both North as with us, and the hour proposed be between noon and six, take the declination out of the fourth ark, the remainder shall be a fifth Ark:---- But if the hour fall between six and midnight, or the latitude and declination be unlike (one North, the other South) add the declination to the fourth ark, and the Sum shall be a fifth ark; if the Sun exceed 90 deg. take it from 180 deg. the remain is the fifth ark. The fifth ark being found,

*Say,*

As the sine of the fourth ark, to the sine of the latitude; so the Co-sine of the fifth Ark, to the sine of the altitude.

So the latitude being 51 deg. 30 min. North. the declination 23 d. 30 m. North; If it be required to find the Suns altitude at 7 in the morning, you shall find it to be 27 deg. 17. min.

**Prop. 10.** *The latitude of the place, the declination of the Sun, and the altitude of the Sun given to find his Azimuth.*

**C**onsider whether the Suns declination be North or South, so have you his distance from the Pole.----- Add the Suns distance from the Pole, the complement of your latitude, and the complement of your altitude all three into one sum, and from half that sum, subtract the distance of the Sun from the Pole; and note the difference;

*Then say,*

1. As Radius, to the Co-sine of the altitude, so the Co-sine of the latitude to a fourth sine.

2. As this fourth sine is to the sine of the half sum; so is the sine of the difference to a seventh sine; unto which seventh sine, if you add the sine of 90 deg. half that sum will be the sine of an ark, whose complement being doubled is the Azimuth from the North part of the Meridian. So

So if the latitude be 51 deg. 30 min. North, the declination 20 deg. South, and the altitude 12 deg. the Azimuth from the North part of the Meridian will be found to be 140 deg.

**Prop. 11.** *The latitude given, to find how many minutes, or miles of the Equinoctial, make a degree of longitude in any Parallel.*

**AS** the sine of 90 deg. is to the sine of 60 deg. so the Cosine of the latitude, to the miles answerable to a degree in the latitude desired.

So in the latitude of 51 deg. 40 min. 37 miles will answer to one degree in the longitude.

**Prop. 12.** *The course and distance given, to find the difference of latitude.*

**AS** the sine of 90 deg. to the Logarithm of the miles run, so the sine of the courses distance from East or West, to the difference of latitude.

So if the course be West S W (which is 22 deg. 30 m. from the West) the miles 225, the difference of latitude will be found to be 1 deg. 26 min.

**Prop. 13.** *The course and distance given, to find the difference of longitude.*

**AS** the sine of 90 deg. is to the miles run, so is the sine of your course from South to North, to the miles you are departed from your first Meridian.

So if the course be N W by N (which is 33 deg. 45 min. from the North) the miles run 180, the number of miles which you are departed from the Meridian will be found to be 100, which if you divide by the number of miles answerable to a degree of longitude in the latitude, you then find yourself to be; the quotient gives you the degrees and minutes of difference of longitude.

**Prop**

Prop. 14. *The distance and departure from the Meridian given, to find the course.*

**A**s the miles run, to the sine of 90, so the departure from the Meridian, to the sine of your course from North to South.  
So if the departure from the Meridian be 75 miles, in running 150 miles, the course steered is 30 d. which is S W by S Southerly.

Prop. 15. *The latitude of the place, the declination and altitude of the Sun given, to find the hour of the day.*

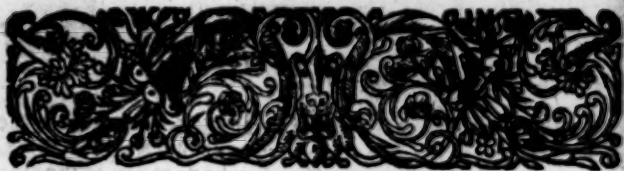
**A**dd the Suns distance from the Pole, the complement of the latitude, and the complement of the altitude into one Sum, and from half the sum subtract the complement of the altitude, noting the difference;

*Then say,*

1. As Radius, to the sine of the Suns distance from the Pole, so the Co-sine of the latitude, to a fourth sine ——— Then,
2. As this fourth sine, to the sine of the half-sum, so the sine of the difference, to a seventh sine; unto which seventh sine, if you add the sine of 90 deg. half that sum will be the sine of an ark, whose complement doubled and converted into time, is the hour required.

So if the latitude be 51 deg. 30 min. the declination 20 deg. Northward, and the altitude 12 deg. the time will be found to be 6 hours 24 min. almost.

*The*



The use of the following Tables in Questions that concern *Geography*.

**T**Hough there be diverse ways to find the distance of places, viz. by the Globe, by Maps, Geometrically, &c. Yet the most exact of all other is by *Trigonometry*, which way we will here lay down in three Propositions.

*Prop. 1. Two places differing onely in the Latitude to find their distance.*

In this Proposition there are two varieties viz.

1. If the two places propounded lie under one and the same Meridian, and both of them on one side of the Equinoctial; you must subtract the lesser Latitude from the greater, and the remainder converted into miles (by allowing 60 miles to a degree) will be the distance required.

*Example, Vincentia and Augusta lie under one and the same Meridian, and both on the North side of the Equinoctial; Vincentia having 44 d. 55 m. latitude, and Augusta 47 d. 42. min. latitude; the difference of latitude is 2 d. 47 m. which converted into miles by multiplying it by 60. and adding thereto the odd minutes, maketh 167 miles, and that is their distance.*

2. If one place lie on the North, and the other on the South-side of the Equinoctial (yet both under the same Meridian) you must then add both the latitudes together, and the sum converted into miles, will give their distance.

*Prop. 2. Two places differing onely in Longitude, being given, to find their distance.*

In this Proposition also there are two varieties.

1. If the two places propounded lie under the Equinoctial, then

When the difference of their longitudes reduced into miles (allowing 60 miles to a degree) giveth the distance of the places required.

*Example.* It is required to know the distance of the Island *Samarra* from the Island *St. Thomas*, (both lying under the Equinoctial) the Island *Samarra* hath long. 137 d. 10 m. and the Island of *St. Thomas* hath long. 33 d. 10 min. therefore the difference of their longitude is 104 d. which multiplied by 60, maketh 2640 miles, which is the distance of the said places.

2. But if the two places propounded differ onely in longitude, and lie not under the Equinoctial, but under some other intermediate Parallel, between the Equinoctial and one of the Poles, then to find their distance, the proportion will be,

As the Radius, or 90 deg. is to the Co-sine of the common latitude;

So is the sine of half the difference of longitude, to the sine of half their distance.

*Example.* The Cities of *Compostella* and *Constantinople* have both one latitude, viz. 43 deg. 0 min. but differ in longitude 43 deg. 15. min. The complement of their latitude is 47 deg. and the half longitude is 21 deg. 37 min. 30 seconds; therefore the operation is thus to be framed.

The Radius or sine of 90 deg.

10,

the Co-sine of the common latitude 47 d.

9,8641

The sine of the half difference of longitude 21 d. 37 m. 30 sec.

3

9,5664

The sine of half their distance

9,41033

whose arch 15 d. 31 m. being doubled, giveth 31 d. 16 m. which converted into miles (as before is taught) giveth 1876, which is the distance between the two places required.

Prop. 3. Two places being given, which differ both in longitude and latitude, to find their distance.

In this Proposition is contained three varieties.

1. If one place be under the Equinoctial Circle, and the other towards either Pole, then the proportion is,

As the Radius or sine of 90 degrees

Is to the Co-sine of the difference of longitude:

So is the Co-sine of the latitude given,

To the Co-sine of their distance required.

*Example*

*Example.* If it were required to find the distance of the Island of *St. Thomas* (which lieth directly under the Equinoctial, and hath longitude 38 deg.) and the City of *London* (which hath 51 d. 30 min. latitude, and 20 d. longitude) their distance will be found to be 3122 miles.

2. If both the places propounded be without the Equinoctial, and on the Northern or Southern side thereof, then the proportion must be wrought at two operations, and because there is some difficulty therein, we have added the following figure, which will make it perspicuous to the meanest capacity.

Let *D* represent *London*, whose latitude is *F D* 51 deg. 30 min. and longitude 20 d. 00 min. and let *O* represent *Jerusalem*, whose latitude *M O* is 31 deg. 40 min. and longitude 66 degrees, which being known, you have given (1) the side *BD*, the complement of the latitude of



*London*, 38 degree, 34 min. (2) the side *BO*, the complement of the latitude of *Jerusalem*, 58 degrees, 20 min. (3) the angle *DBO* (whose measure is *FM*) the difference of latitude 46 deg. 20 min. and it is required to find the side *DB*. Therefore the proportion is,

1. As the Radius <i>BM</i> 90 degrees,	10,0000000
To the Co-sine of <i>DBO</i> 44 degrees.	9,8417712
So is the tangent of <i>DB</i> 38 deg. 30 min.	9,9006032
To the tangent of <i>BP</i> 23 deg. 55 min.	9,7423764
Which being subtracted from <i>BO</i> 58 deg. 20 min. there remaineth <i>OP</i> , 29 deg 25 min. then say,	
2. As the Co-sine of <i>BP</i> 61 d. 5 min.	9,9421688
To the Co-sine of <i>PO</i> 60 d 37 min.	9,9100535
So is the Co sine of <i>DB</i> 51 d. 30 min.	9,8915443

19,8335978  
To.

To the Co-sine of D O 51 d. 5 min. 9.8914290  
 whose complement is 38 deg. 5 m. which converted into miles  
 before is taught, *see* 2331 miles, and such is the distance re-  
 quired.

If the two places propounded differ both in longitude and  
 latitude, and be both of them without the Equinoctial, and one  
 of them towards the North, and the other toward the South  
 Pole, then the proportion is

As the Radius is to the Co-sine of the difference of longi-  
 tude,

So is the Co-tangent of one of the latitudes, to the Tangent of  
 another arc,

Which being subtracted out of the other latitude, and 90 d.  
 added thereto, say

2 As the Co-sine of the arc found, is to the Co-sine of the  
 arc remaining,

So is the Co-sine of the latitude first taken, to the Co-sine of  
 the distance.

These are all the varieties that can possibly happen in any  
 proposition concerning the distance of places, and is the exactest  
 that can be invented, provided the longitude and latitude  
 truly given.

A

A Table shewing the Longitude and Latitude of all the principal Cities and places in *Europe*, according to the Observations of *Tycho*, *Longo-*  
*montanus*, *Kepler*, and others.

The Names of the Places	Latitude		Longitude
	D	M	
<i>Alexandria in Egypt</i>	30	59	60
<i>Amsterdam</i>	52	20	18
<i>Antioch</i>	37	26	70
<i>Antwerp in Brabant.</i>	51	12	18
<i>Aquisgrane</i>	51	06	18
<i>Athens</i>	37	42	52
<i>Avon 9a Vindel</i>	43	22	35
<i>Babylon</i>	35	00	73
<i>Barrwick</i>	55	50	19
<i>Bridge in Flanders</i>	51	30	34
<i>Brunswick</i>	52	16	34
<i>Brandenburg</i>	52	30	37
<i>Calecute in India</i>	11	20	11
<i>Cartile</i>	54	50	19
<i>Canterbury</i>	51	15	20
<i>Cambridge</i>	52	17	20
<i>Calice</i>	50	30	20
<i>Constantinople</i>	43	05	55
<i>Cover</i>	51	20	21
<i>Dublin</i>	54	40	12
<i>Damascus</i>	33	00	69
<i>Edinburgh in Scotland</i>	56	26	20
<i>Ephesus</i>	37	40	57
<i>Frankford up'n Maine</i>	50	01	32
<i>Frankford up'n Od.</i>	52	20	38
<i>Florence</i>	43	10	35

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The Names of the  
Places.

Latitude		Longit.	
D.	M.	D.	M.
45	15	19	50
53	42	34	15
32	10	70	45
53	00	10	30
51	32	10	00
52	42	19	42
39	38	09	10
51	31	16	40
30	00	64	00
50	43	32	35
51	34	31	10
40	42	38	35
53	01	10	07
41	50	15	05
35	56	80	30
49	26	35	45
51	50	19	00
50	06	38	15
48	40	20	20
45	06	36	25
52	30	20	20
42	00	36	30
37	40	19	00
51	55	27	35
29	50	63	30
38	34	59	45
47	42	37	50
52	36	20	10
49	24	33	00
48	34	33	45
45	15	36	15
48	30	40	00
55	54	36	45
51	50	37	16
50	25	31	30
33	30	10	10

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eeterburg  
ome  
Quinzay  
otterdam  
ed-ſea  
ardes in Lydia  
Salisbury  
Stamford  
Spier  
Tubing Wittenberg  
Venice  
Vienna  
Wraniburg  
Wittenburg  
Worms  
York

Gen

## The use of the Tables of the Sun and Stars Right Ascension.

**A**T the end of this Book, you have two Tables the one shewing the right Ascension of the Sun every day in the year, the other sheweth the right Ascension, and Declination of certain of the most eminent fixed Stars. I will in this place shew how by the joyned use of these two Tables, any Star mentioned in the Table of Stars will come to the Meridian, and the rule will hold general for any Star, whose right Ascension and Declination is known. The manner of working is as followeth.

### The RULE.

Subtract the right Ascension of the Sun from the right Ascension of the Star, (whose time of coming to the Meridian is required) the Remainder is the time of the said Stars coming to the Meridian, Afternoon but if the right Ascension of the Star be less then the right Ascension of the Sun, add Twenty four hours thereunto, and subtract the right Ascension of the Sun therefrom, the Remainder is the time of the Stars coming to the Meridian.

**Example.** Upon the Eleventh of December, it is required to know when the Bulls eye comes to the Meridian; by your Table of the Suns right Ascension you find that the Suns right Ascension on the Eleventh of December, is Seventeen hours fifty nine minutes, and in your Table of Stars you find the right Ascension of the Bulls-eye to be four hours ten minutes. Now (according to your rule) because the right Ascension of the Sun is more then the right Ascension of the Stars, and Subtraction cannot be made, you must add

Twenty

# To find the hour of the night.

35

Twenty four hours to the Stars Declination, so will the  
be Twenty eight hours ten minntes; from which  
ke Seventeen hours fifty nine minutes, the right As-  
ension of the Sun, the Remainer will be Ten hours  
even minutes, at which time the Bulls-eye will come  
the Meridian on the Eleventh of December, after  
e Sun, that is, at eleven minutes past ten at night, the  
ulls-eye will be due South, the like of any other Star  
hose right Ascension is known. See the following work.

	ho. mi.
Right Ascension of the Sun on the Eleventh of Decemb.	17 59
Right Ascension of the Bulls-eye	4 10
Twenty four hours added	24 0
The Sum	28 10
The Suns right Ascension subtracted	17 59
Remains	10 11
The true time that the Bulls-eye will come to the Meridian.	

This Rule here delivered is of excellent use for  
Seamen, thereby to find their Latitude; for it is to be  
noted, that the Rules which you observe for finding of  
our Latitude by the Sun, the same may be performed  
by the Stars, they being upon the Meridian, as is  
already noted in the last Page of my doctrine of Trian-  
gles, to which I refer you.

The Altitude of any known Star being given, to  
find thereby the hour of the night.

**B**Y the former Rule find the time of the known  
Stars coming to the Meridian, on the day propo-  
sed. Then seek out the Horary distance of that Star  
from the Meridian, which may be found by the same  
Rule, as you find the hour of the day by the Sun, as is  
Prop. 15.

These things being found, if the Star be on the East side, not yet come to the Meridian, the difference of those two numbers of hours is the hour of the night; but if the Star be Westward past the Meridian, the sum of those number of hours is the hour of the night.

Of finding the Variation of the Compass.

By the third Proposition before going, you are taught to find the Suns amplitude, that is, how far distant the Sun riseth or setteth from the true East or West point of the Horizon.

Thus if the Latitude given were Fifty one degree thirty two minutes, and the Suns Declination Fifteen degrees ten minutes North, the Amplitude will be found to be Twenty four degrees fifty two minutes North, because the Suns Declination was North.

Of the Amplitude thus found, there is often use made at Sea, for finding the Variation of the Compass; which is done after this manner.

Supposing the circumference or outermost edge of the Card or Flie of the Compass to be divided into three hundred sixty degrees, and the Points of the Needles to be placed directly under the Flower de Luce, or North and South Points: You are to observe at Sun-rising or setting, how many degrees the Sun is from the East or West Points of the Compass, which number of degrees, if they agree with the Amplitude found by this Position, as is before shewed, and be on the same side, then hath the Compass no Variation; but if they differ, look how many degrees that difference is, so much is the Variation.

As for Examyle; Admit I find the Amplitude to be

## Of the Variation of the Compass. 37

Twenty four degrees fifty two minutes Northerly, when I know that the Sun should set almost Twenty five degrees from the West to the Northwards; but observing at Sun-setting with my Compass, admit I find it to set but nineteen degrees from the West Point of my Compass to the Northwards, then hereby I gather that the Variation of my Compass is almost six degrees: And thus you may find how much the Variation of the Compass is. Now

To find which way the Compass varieth.

If the degree of the Compass which directly respects the Sun at his rising or setting, (namely, the degree of Amplitude found as before) be more towards the right hand, then the Sun rising or setting, the Variation is Easterly; but if it be more towards the left hand, the Variation is Westerly: Because when a mans face is towards the North, the East is on his right hand, and the West on his left.

As in this Example, I find by the Amplitude that the Sun should be set almost Twenty five degrees from the West point of my Compass Northerly; but setting the Sun, I see that the Twenty fifth degree of my Compass is more towards the right hand than the place of Sun set, therefore I conclude, that the Variation is Easterly.

And thus is the Variation of the Compass found to be almost six degrees Easterly, so that the North point of the Compass shews not the true North, but points almost six degrees to the Eastward of the North, and consequently all the other points of the Compass direct more towards the right hand, than they should do by

almost six degrees: And the like in all Points is to be understood, if the observation had been made at Sun-rising.

*Note.* It is fittest to make these observations when the Sun seems to be a little above the Horizon, namely, when the lower edge of the Sun seems almost to touch the Horizon, though by reason of his refraction and parallax he seem to be above it.

By the Altitudes of any two known fixed Stars taken, when they are both in the same Azimuth, to find the height of the Pole.

**F**irst say,  
As the sine of the difference of the Stars Altitudes, is to the sine of the difference of their right Ascension; so is the sine of the nearer Stars distance from the Apparent Pole, to the sine of an angle to be kept.

Again, Compare the furthest Stars distance from the Pole, with the distance from the Zenith, and say,

As the Radius, is to the sine of the complement of the Angle kept; so is the Tangent of the lesser of the compared arches to the Tangent of the first base.

Subduct the first base out of the greater of the two compared arches; & the remains shall be the second base.

Then lastly say,

As the sine of the complement of the first base, Is to the sine of the complement of the second base; So is the sine of the complement of the lesser of the two compared arches,

To the sine of the height of the Pole or Latitude.



THE  
Description and Use  
OF  
An Universal

ALMANACK.

BEfore you can well make use of this Almanack, you must know on what day of the week the first day of March falleth upon in any year, which the Table adjoyning plainly sheweth for 20 years, viz. to the year 1680, which Table may be continued so far as you please, by leaving out one day between every fourth year, as you see done in the years of this Table.

The day of the week on which the first day of March falls upon being known, the day of the month for ever may be easily found, as by Example following will appear.

A Table shewing what day of the week the first day of March will fall upon for 20 years.

1661	Friday
1662	Saturday
1663	Sunday
1664	Tuesday
1665	Wednesday
1666	Thursday
1667	Friday
1668	Sunday
1669	Monday
1670	Tuesday
1671	Wednesday
1672	Friday
1673	Saturday
1674	Sunday
1675	Monday
1676	Wednesday
1677	Thursday
1678	Friday
1679	Saturday
1680	Monday

A Figure of the Universal Almanack.

March Novemb.	August	May January	October	April Ju'y	Septemb Decemb.	June Februa.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

## The Uses of the Universal Almanack.

*The Uses of this Almanack are only two,*

The first is, *Any day of the Week in any Month or Year being given, to know what day of the Month it is.*

The second use is, *Any year, and day of any Month of that year being given, to know what day of the week it is.*

*Example of the first.* Let it be required to know what day of the Month the first Monday in *August* this year 1664 will be.

By the first Table you shall find the first of *March* was Tuesday. Now look in the Almanack (in the head thereof) for the Month of *August*, under which you shall find these numbers 1, 9, 16, 23, 30, which denotes, that the second, the 9th, the 16th, the 23 and the 30th. days of *August* were Tuesdays, because the first of *March* was a Tuesday, than the ninth day of *August* being Tuesday, the eighth day must be Monday, and so for any other Month. As in the Months of *April* or *July*, the 5, 12, 19, and 26 days of either of those months are Tuesdays.

*Example of the second,* What day of the Week will the 20 day of *October* be in the year 1673? The first of *March* in that year will be Saturday; therefore the 4, 11, 18, and 25th. days of *October* are Saturdays. Then the 18th, being Saturday, the 20th, will be Monday.

Thus for every year what day of the week the first of *March* is of, the dayes under any Month of that year are of the same day of the week, whether Sunday, Monday, or Tuesday, &c. and so for ever.

---

*Books lately printed for Geo. Hurlock, at St. Magnus Church-Corner, near Thames-street by London-Bridge.*

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FINIS.

*It with purity*  
A

# TRIANGULAR CANON

Logarithmical.

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*Sines, Tangents, and the Com-*  
*plements Arithmetical of Sines*  
supplying the use of  
*Secants.*

To Radius 10,00000, and to every Degree  
and Minute of the *Quadrant.*

---

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CANON

Logarithmical

OR

A TABLE of Artificial

Sines, Tangents, and the Cores

for the use of Astronomers

and Surveyors

By W. L.

and of the use of the

Logarithmical

Table

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## To the R E A D E R.



HIS Table of Artificial  
*Sines, Tangents, & Arith-*  
*metical Complements of*  
*Sines* to supply the use  
of *Secants*, with a *Chiliad*  
of One Thousand *Logarithms*, is  
thought fit (by Mr. *Rich. Norwood*, and  
*Hen. Bond*) to be printed to the *Radius*  
10,0000, that such as are desirous  
thereof may have it at a more reason-  
able rate, than the other larger *Tables*  
are at; and because it is in a more  
portable volume, and is of the same  
use that the other *Tables* are; For by  
these *Tables* may be resolved all plain  
and Spherical *Triangles*, and all *Pro-*  
*blems* of *Sayling*, either according to  
the plain *Sea-chart*, or according to  
*Mercators-chart* (without any other  
Meridional parts; then what are con-  
tained in these *Tables*) as it may partly  
appear, if you look in the latter end  
of the *Appendix* of the *Path-way to per-*  
*fect Sayling*, now newly Printed, *Vale.*

(4)

Sine.	Sine comple.	Tang.	Tangent comple.	com. ar.	com. ar.
of Sine.				of Sine.	of fi. co.
0	0	1000000	0	Infinite	60
1	646372	999999	646372	1353627	59
2	676475	999999	676475	1323524	58
3	694084	999999	694084	1305915	57
4	706578	999999	706578	1293421	56
5	716269	999999	716269	1283730	55
6	724187	999999	724187	1275812	54
7	730882	999999	730882	1269117	53
8	736681	999999	736681	1263318	52
9	741796	999999	741796	1258203	51
10	746372	999999	746372	1253627	50
11	750511	999999	750512	1249487	49
12	754290	999999	754290	1245709	48
13	757766	999999	757767	1242232	47
14	760985	999999	760985	1239014	46
15	763981	999999	763982	1236017	45
16	766784	999999	766784	1233215	44
17	769417	999999	769417	1230582	43
18	771899	999999	771900	1228099	42
19	774247	999999	774248	1225751	41
20	776475	999999	776476	1223523	40
21	778594	999999	778595	1221404	39
22	780614	999999	780615	1219384	38
23	782545	999999	782546	1217453	37
24	784393	999999	784394	1215605	36
25	786166	999999	786167	1213832	35
26	787869	999999	787870	1212129	34
27	789508	999999	789509	1210490	33
28	791087	999999	791089	1208910	32
29	792611	999999	792613	1207386	31
30	794084	999999	794085	1205914	30
Sine. Tangent					
comple.	Sine.	Tangent	Tang.	89	
		comple.			

Sine.		Sine Comple.	Tang.	Tangent Comple.	Cum. Ar. Cos. 1st. of Sine. of Si.co.	
30	794084	999998	794085	1205914	30	2059151 000001
31	795508	999998	795509	1204490	29	2044910 000001
32	796886	999998	796888	1203111	28	2031130 000001
33	798223	999998	798225	1201774	27	2017760 000002
34	799519	999997	799521	1200478	26	2004800 000002
35	800778	999997	800780	1199219	25	1992210 000002
36	802002	999997	802004	1197995	24	1979970 000002
37	803191	999997	803194	1196805	23	1968080 000002
38	804350	999997	804352	1195647	22	1956490 000002
39	805478	999997	805480	1194519	21	1945210 000002
40	806577	999997	806580	1193419	20	1934220 000002
41	807649	999996	807653	1192346	19	1923500 000003
42	808696	999996	808699	1191300	18	1913030 000003
43	809718	999996	809721	1190278	17	1902810 000003
44	810716	999996	810720	1189279	16	1892830 000003
45	811692	999996	811696	1188303	15	1883070 000003
46	812647	999996	812650	1187349	14	1873520 000003
47	813581	999995	813585	1186414	13	1864180 000004
48	814495	999995	814499	1185500	12	1855040 000004
49	815390	999995	815395	1184604	11	1846090 000004
50	816268	999995	816272	1183727	10	1837310 000004
51	817128	999995	817132	1182867	9	1828710 000004
52	817971	999995	817976	1182023	8	1820280 000004
53	818798	999994	818803	1181196	7	1812010 000005
54	819610	999994	819615	1180384	6	1803890 000005
55	820407	999994	820412	1179587	5	1795920 000005
56	821189	999994	821195	1178804	4	1788100 000005
57	821958	999994	821964	1178035	3	1780410 000005
58	822713	999993	822719	1177280	2	1772860 000006
59	823455	999993	823462	1176537	1	1765440 000006
60	824185	999993	824192	1175807	0	1758140 000006
Sine Comple.		Sine.	Tangent Comple.	Tang.	89	

I	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar.	com. ar.
					of Sine.	of $\frac{1}{2}$ co.
0	824185	999993	824192	1175807	60	175814
1	824903	999993	824910	1175089	59	175096
2	825609	999992	825616	1174383	58	174390
3	826304	999992	826311	1173688	57	173695
4	826988	999992	826995	1173004	56	173011
5	827661	999992	827669	1172330	55	172338
6	828324	999992	828332	1171667	54	171675
7	828977	999991	828985	1171014	53	171022
8	829630	999991	829629	1170370	52	170379
9	830254	999991	830263	1169736	51	169745
10	830879	999991	830888	1169111	50	169120
11	831495	999990	831504	1168495	49	168504
12	832102	999990	832112	1167887	48	167897
13	832701	999990	832711	1167288	47	167298
14	833292	999989	833302	1166697	46	166707
15	833875	999989	833885	1166114	45	166124
16	834450	999989	834461	1165538	44	165549
17	835018	999989	835028	1164971	43	164981
18	835578	999988	835589	1164410	42	164421
19	836131	999988	836142	1163857	41	163868
20	836677	999988	836689	1163310	40	163322
21	837217	999987	837229	1162770	39	162782
22	837749	999987	837762	1162237	38	162250
23	838276	999987	838288	1161711	37	161723
24	838796	999987	838809	1161190	36	161203
25	839310	999986	839323	1160676	35	160689
26	839817	999986	839831	1160168	34	160182
27	840319	999986	840333	1159666	33	159680
28	840816	999985	840830	1159169	32	159183
29	841306	999985	841321	1158678	31	158693
30	841791	999985	841806	1158193	30	158208

Sine Comple.	Sine.	Tangent Comple.	Tang. 88
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I	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of Si. co.	
30	841791	999985	841806	1158193	30	158208	000014
31	842271	999984	842286	1157713	29	157728	000015
32	842746	999984	842761	1157238	28	157253	000015
33	843215	999984	843231	1156768	27	156784	000015
34	843679	999983	843696	1156303	26	156320	000016
35	844139	999982	844156	1155843	25	155860	000016
36	844594	999983	844611	1155388	24	155405	000016
37	845044	999982	845061	1154938	23	154955	000017
38	845489	999982	845506	1154493	22	154510	000017
39	845930	999981	845948	1154051	21	154069	000018
40	846366	999981	846384	1153611	20	153633	000018
41	846798	999981	846817	1153182	19	153201	000018
42	847226	999980	847245	1152754	18	152773	000019
43	847649	999980	847669	1152330	17	152350	000019
44	848069	999980	848089	1151910	16	151930	000019
45	848484	999979	848505	1151494	15	151515	000020
46	848896	999979	848916	1151083	14	151103	000020
47	849303	999978	849325	1150674	13	150696	000021
48	849707	999978	849729	1150270	12	150292	000021
49	850107	999978	850129	1149870	11	149892	000021
50	850504	999977	850526	1149473	10	149495	000022
51	850897	999977	850920	1149079	9	149102	000022
52	851286	999976	851309	1148690	8	148713	000023
53	851672	999976	851696	1148303	7	148327	000023
54	852055	999976	852079	1147920	6	147944	000023
55	852434	999975	852458	1147541	5	147565	000024
56	852810	999975	852834	1147165	4	147189	000024
57	853182	999974	853207	1146792	3	146817	000025
58	853552	999974	853577	1146422	2	146447	000025
59	853918	999973	853944	1146055	1	146081	000026
60	854281	999973	854308	1145691	0	145718	000026
Sine Comple				Sine.	Tangent Comple.	Tang.	88

2	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of sine	Com. ar. of st. co.	
0	854281	999973	854308	1145691	60	145718	000026
1	854642	999973	854669	1145330	59	145357	000026
2	854999	999972	855026	1144973	58	145000	000027
3	855353	999972	855381	1144618	57	144646	000027
4	855705	999971	855733	1144266	56	144294	000028
5	856054	999971	856082	1143917	55	143945	000028
6	856399	999970	856429	1143570	54	143600	000029
7	856743	999970	856772	1143227	53	143256	000029
8	857083	999969	857113	1142886	52	142916	000030
9	857421	999969	857451	1142548	51	142578	000030
10	857756	999968	857787	1142212	50	142242	000031
11	858089	999968	858120	1141879	49	141910	000031
12	858419	999967	858451	1141548	48	141580	000032
13	858746	999967	858779	1141220	47	141253	000032
14	859072	999967	859105	1140894	46	140927	000033
15	859394	999966	859428	1140571	45	140605	000033
16	859715	999966	859749	1140250	44	140284	000033
17	860033	999965	860067	1139932	43	139966	000034
18	860348	999965	860383	1139616	42	139651	000035
19	860662	999964	860697	1139302	41	139337	000035
20	860973	999963	861009	1138990	40	139026	000036
21	861282	999963	861318	1138681	39	138717	000036
22	861589	999962	861626	1138373	38	138410	000037
23	861893	999962	861931	1138068	37	138106	000037
24	862196	999961	862234	1137765	36	137803	000038
25	862496	999961	862535	1137464	35	137503	000038
26	862794	999960	862834	1137165	34	137205	000039
27	863091	999960	863130	1136869	33	136908	000039
28	863385	999959	863425	1136574	32	136614	000040
29	863677	999959	863718	1136281	31	136322	000040
30	863967	999958	864009	1135990	30	136032	000041
	Sine Comple.	Sine.	Tangent Comple.	Tang.	87		

	Sine.	Sine comple.	Tang.	Tangent comple.		com. ar. of Sine.	com. ar. of fi. co.
26	863967	999958	864009	1131990	30	136032	000041
26	864256	999958	864298	1135701	29	135743	000041
27	864542	999957	864585	1135414	28	135457	000042
27	864827	999956	864870	1135129	27	135172	000043
28	865110	999956	865153	1134848	26	134889	000043
28	865391	999955	865435	1134564	25	134608	000044
29	865670	999955	865714	1134285	24	134329	000044
29	865947	999954	865992	1134007	23	134051	000045
30	866223	999954	866268	1133731	22	133776	000045
30	866496	999953	866543	1133456	21	133503	000046
31	866764	999952	866815	1133184	20	133231	000047
31	867039	999952	867086	1132913	19	132960	000047
32	867308	999951	867356	1132643	18	132691	000048
32	867575	999951	867623	1132376	17	132424	000048
33	867840	999950	867889	1132110	16	132159	000049
33	868104	999949	868154	1131845	15	131895	000050
34	868366	999949	868417	1131582	14	131633	000050
34	868627	999948	868678	1131321	13	131372	000051
35	868886	999948	868938	1131061	12	131113	000051
35	869143	999947	869196	1130803	11	130856	000052
36	869399	999946	869452	1130547	10	130600	000053
36	869654	999946	869708	1130291	9	130345	000053
37	869907	999945	869961	1130038	8	130092	000054
37	870158	999944	870213	1129786	7	129841	000055
38	870408	999944	870464	1129535	6	129591	000055
38	870657	999942	870713	1129284	5	129342	000056
39	870904	999943	870961	1129038	4	129095	000056
39	871150	999942	871208	1128791	3	128849	000057
40	871395	999941	871453	1128546	2	128604	000058
40	871638	999941	871697	1128302	1	128361	000058
41	871880	999940	871939	1128060	0	128119	000059

Sine. | Sine. | Tangent. | Tang. | 87

3	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. of Si.	Si
0	871880	999949	871939	1128060	60	128119	0000
1	872120	999939	872180	1127819	59	127879	0000
2	872359	999939	872420	1127579	58	127640	0000
3	872597	999938	872658	1127341	57	127402	0000
4	872833	999937	872895	1127104	56	127166	0000
5	873068	999937	873121	1126868	55	126931	0000
6	873302	999936	873366	1126633	54	126697	0000
7	873535	999935	873599	1126400	53	126464	0000
8	873766	999935	873831	1126168	52	126233	0000
9	873996	999934	874062	1125937	51	126003	0000
10	874225	999933	874292	1125707	50	125774	0000
11	874453	999932	874520	1125479	49	125546	0000
12	874680	999932	874747	1125252	48	125319	0000
13	874905	999931	874974	1125026	47	125094	0000
14	875129	999930	875198	1124801	46	124870	0000
15	875352	999930	875422	1124577	45	124647	0000
16	875574	999929	875645	1124354	44	124425	0000
17	875795	999928	875866	1124133	43	124204	0000
18	876015	999927	876087	1123912	42	123984	0000
19	876233	999927	876306	1123693	41	123766	0000
20	876451	999926	876524	1123475	40	123548	0000
21	876667	999925	876741	1123258	39	123332	0000
22	876882	999924	876957	1123042	38	123117	0000
23	877096	999924	877172	1122827	37	122903	0000
24	877310	999923	877386	1122613	36	122689	0000
25	877522	999922	877599	1122400	35	122477	0000
26	877733	999921	877811	1122188	34	122266	0000
27	877943	999921	878022	1121977	33	122056	0000
28	878152	999920	878231	1121768	32	121847	0000
29	878360	999919	878440	1121559	31	121639	0000
30	878567	999918	878648	1121351	30	121432	0000
	Sine Comple.	Sine.	Tangent Complem.	Tang.	86		

Com. of Si.	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si. co.	
0000	78567	999918	878648	1121851	30	121432	000081
0000	78773	999918	878855	1121144	29	121326	000081
0000	78978	999917	879061	1120938	28	121021	000082
0000	79182	999916	879266	1120733	27	120817	000083
0000	79385	999915	879470	1120529	26	120614	000084
0000	79588	999915	879673	1120326	25	120411	000084
0000	79789	999914	879875	1120124	24	120210	000085
0000	79989	999913	880076	1119923	23	120010	000086
0000	80189	999912	880276	1119723	22	119810	000087
0000	80387	999911	880475	1119524	21	119612	000088
0000	80585	999911	880674	1119325	20	119414	000088
0000	80781	999910	880871	1119128	19	119218	000089
0000	80977	999909	881068	1118931	18	119022	000090
0000	81172	999908	881264	1118735	17	118827	000091
0000	81366	999907	881458	1118541	16	118633	000092
0000	81559	999906	881652	1118347	15	118440	000093
0070	81752	999906	881846	1118153	14	118247	000093
0071	81943	999905	882037	1117961	13	118056	000094
0072	82134	999904	882229	1117770	12	117865	000095
0073	82324	999903	882420	1117579	11	117675	000096
0074	82512	999902	882610	1117389	10	117487	000097
0075	82701	999901	882799	1117200	9	117298	000098
0076	82888	999901	882987	1117012	8	117111	000098
0077	83074	999900	883174	1116825	7	116925	000099
0078	83260	999899	883361	1116638	6	116739	000100
0079	83445	999898	883547	1116452	5	116554	000101
0080	83629	999897	883732	1116267	4	116370	000102
0081	83813	999896	883916	1116083	3	116186	000103
0082	83995	999895	884099	1115900	2	116004	000104
0083	84177	999894	884282	1115717	1	115822	000105
0084	84358	999894	884464	1115535	0	115641	000105

Sine	Sine.	Tangent	Tang.
Comple.	Comple.	Comple.	86

4	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. of Sine.
0	884358	999894	884464	1115535	60	115641
1	884538	999893	884645	1115354	59	115461
2	884718	999892	884825	1115174	58	115281
3	884897	999891	885005	1114994	57	115102
4	885075	999890	885184	1114815	56	114924
5	885252	999889	885362	1114637	55	114747
6	885429	999888	885540	1114459	54	114570
7	885604	999887	885717	1114282	53	114395
8	885780	999886	885893	1114106	52	114219
9	885954	999885	886068	1113931	51	114045
10	886128	999885	886243	1113756	50	113871
11	886301	999884	886417	1113582	49	113698
12	886473	999883	886590	1113409	48	113526
13	886645	999882	886763	1113236	47	113354
14	886816	999881	886935	1113064	46	113183
15	886986	999880	887106	1112893	45	113013
16	887156	999879	887276	1112723	44	112843
17	887325	999878	887446	1112553	43	112674
18	887493	999877	887616	1112383	42	112506
19	887661	999876	887784	1112215	41	112338
20	887828	999875	887952	1112047	40	112171
21	887994	999874	888120	1111879	39	112005
22	888160	999873	888286	1111713	38	111839
23	888325	999872	888453	1111546	37	111674
24	888490	999871	888618	1111381	36	111509
25	888654	999870	888783	1111216	35	111345
26	888817	999869	888947	1111052	34	111182
27	888980	999868	889111	1110888	33	111019
28	889142	999867	889274	1110725	32	110857
29	889303	999866	889436	1110563	31	110696
30	889464	999865	889598	1110401	30	110535
	Sine Comp.	Sine.	Tangent Complem.	Tang.	85	

Sine.	Sine Comple.	Tang.	Tangens Comple.	Com. ar. of Sine.	Com. ar. of Si. co.	
89464	999865	889598	1110401	30	110535	000134
89624	999764	889759	1110240	29	110375	000135
89784	999863	889920	1110079	28	110215	000136
89943	999862	890080	1109919	27	110056	000137
90101	999861	890239	1109760	26	109898	000138
90259	999860	890398	1109601	25	109740	000139
90416	999859	890556	1109443	24	109583	000140
90573	999858	890714	1109285	23	109426	000141
90729	999857	890871	1109128	22	109270	000142
90885	999856	891028	1108971	21	109114	000143
91040	999855	891184	1108815	20	108959	000144
91194	999854	891340	1108659	19	108805	000145
91348	999853	891495	1108504	18	108651	000146
91502	999852	891649	1108350	17	108497	000147
91655	999851	891803	1108196	16	108344	000148
91807	999850	891956	1108043	15	108192	000149
91959	999849	892109	1107890	14	108040	000150
92110	999848	892261	1107738	13	107889	000151
92261	999847	892413	1107586	12	107738	000152
92411	999846	892564	1107435	11	107588	000153
92560	999845	892715	1107284	10	107439	000154
92710	999844	892865	1107134	9	107289	000155
92858	999843	893015	1106984	8	107141	000156
93006	999842	893164	1106835	7	106993	000157
93154	999840	893313	1106686	6	106845	000159
93301	999839	893461	1106538	5	106698	000160
93448	999838	893609	1106390	4	106551	000161
93594	999837	893756	1106243	3	106405	000162
93739	999836	893903	1106096	2	106260	000163
93884	999835	894049	1105950	1	106115	000164
94029	999834	894195	1105804	0	105970	000165

Sine Comple.	Sine.	Tangent Comple.	Tang.	85
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	5 Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar.	com. of fine	of f.
C	894029	999834	894195	1105804	60	105970	00010
1	894173	999833	894340	1105659	59	105826	00010
2	894317	999832	894485	1105514	58	105682	00010
3	894460	999831	894629	1105370	57	105539	00010
4	894603	999829	894773	1105226	56	105396	00017
5	894745	999828	894916	1105083	55	105254	00017
6	894887	999827	895059	1104940	54	105112	00017
7	895028	999826	895202	1104797	53	104971	00017
8	895169	999825	895344	1104655	52	104830	00017
9	895309	999824	895485	1104514	51	104690	00017
10	895449	999823	895626	1104373	50	104550	00017
11	895589	999822	895767	1104232	49	104410	00017
12	895728	999820	895907	1104092	48	104271	00017
13	895867	999819	896047	1103952	47	104132	00018
14	896005	999818	896186	1103813	46	103994	00018
15	896142	999817	896325	1103674	45	103857	00018
16	896280	999816	896463	1103536	44	103719	00018
17	896416	999815	896601	1103398	43	103583	00018
18	896553	999813	896739	1103260	42	103446	00018
19	896689	999812	896876	1103123	41	103310	00018
20	896824	999811	897013	1102986	40	103175	00018
21	896959	999810	897149	1102850	39	103040	00018
22	897094	999809	897285	1102714	38	102905	00019
23	897228	999808	897420	1102579	37	102771	00019
24	897362	999806	897555	1102444	36	102637	00019
25	897496	999805	897690	1102309	35	102503	00019
26	897629	999804	897824	1102175	34	102370	00019
27	897761	999803	897958	1102041	33	102238	00019
28	897894	999802	898092	1101907	32	102105	00019
29	898025	999800	898225	1101774	31	101974	00019
30	898157	999899	898358	1101642	30	101842	00020
	Sine Comple.	Sine.	Tangent Comple.	Tang.	84		

5	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of fi. co.	
0	898157	999799	898357	1101642	30	101842	000200
1	898288	999798	898489	1101510	29	101711	000201
2	898418	999797	898621	1101378	28	101581	000202
3	898549	999795	898753	1101246	27	101450	000204
4	898678	999794	898884	1101115	26	101321	000205
5	898808	999793	999014	1100985	25	101191	000206
6	898937	999792	999145	1100854	24	101062	000207
7	899066	999790	899275	1100724	23	100933	000209
8	899194	999789	999404	1100595	22	100805	000210
9	899322	999788	899533	1100466	21	100677	000211
0	899449	999787	899662	1100337	20	100550	000212
1	899576	999785	999790	1100209	19	100423	000214
2	899703	999784	899918	1100081	18	100296	000215
3	899829	999783	900046	1099953	17	100170	000216
4	899955	999782	900173	1099826	16	100044	000217
5	900081	999780	900300	1049699	15	099918	000219
6	900206	999779	900427	1099572	14	099793	000220
7	900331	999778	900553	1099446	13	099668	000221
8	900456	999777	900679	1099320	12	099543	000222
9	900580	999775	900804	1099195	11	099419	000224
0	900704	999774	900929	1099070	10	099295	000225
1	900827	999773	901054	1098945	9	099172	000226
2	900950	999771	901179	1098820	8	099049	000228
3	901073	999770	901303	1098696	7	098926	000229
4	901196	999769	901426	1098573	6	098803	000230
5	901318	999768	901550	1098449	5	098681	000231
6	901439	999766	901673	1098326	4	098560	000233
7	901561	999765	901795	1098204	3	098436	000234
8	901682	999764	901918	1098081	2	098317	000235
9	901803	999762	902040	1097959	1	098196	000237
0	901923	999761	902162	1097837	0	098076	000238
	Sine comple.	Sine.	Tangent comple.	Tang.	84		

6	Sine	Sine comple.	Tang.	Tangent comple.	com. ar.	com. ar. of sine.	com. ar. of tan.	6
0	901923	999761	902162	1097837	60	098076	00021	308
1	902043	999760	902183	1097716	59	097956	00021	311
2	902163	999758	902404	1097595	58	097836	00021	314
3	902182	999757	902525	1097474	57	097717	00021	317
4	902401	999756	902645	1097354	56	097598	00021	320
5	902510	999754	902765	1097234	55	097479	00021	323
6	902638	999753	902885	1097114	54	097361	00021	326
7	902756	999752	903004	1096995	53	097243	00021	329
8	902874	999750	903123	1096876	52	097125	00021	332
9	902991	999749	903242	1096757	51	097008	00021	335
10	903108	999747	903360	1096639	50	096891	00021	338
11	903225	999746	903479	1096520	49	096774	00021	341
12	903342	999745	903596	1096403	48	096657	00021	344
13	903458	999743	903714	1096285	47	096541	00021	347
14	903574	999742	903831	1096168	46	096425	00021	350
15	903689	999741	903948	1096051	45	096310	00021	353
16	903804	999739	904065	1095934	44	096195	00021	356
17	903919	999738	904181	1095819	43	096080	00021	359
18	904034	999736	904297	1095702	42	095965	00021	362
19	904148	999735	904412	1095587	41	095851	00021	365
20	904262	999733	904528	1095471	40	095737	00021	368
21	904376	999732	904643	1095356	39	095623	00021	371
22	904489	999731	904758	1095241	38	095510	00021	374
23	904602	999729	904872	1095127	37	095397	00021	377
24	904715	999728	904986	1095013	36	095284	00021	380
25	904827	999727	905100	1094899	35	095172	00021	383
26	904940	999725	905214	1094785	34	095059	00021	386
27	905051	999724	905327	1094672	33	094948	00021	389
28	905163	999722	905440	1094559	32	094836	00021	392
29	905274	999721	905553	1094446	31	094725	00021	395
30	905385	999719	905665	1094334	30	094614	00021	398
	Sine comple.	Sine.	Tangent comple.	Tang.	83			

6	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of fl. co.
30	905185	999719	905665	1094334	30	094614
31	905496	999718	905778	1094421	29	094503
32	905607	999717	905890	1094109	28	094392
33	905717	999715	906001	1093998	27	094281
34	905827	999714	906112	1093887	26	094172
35	905936	999712	906224	1093775	25	094063
36	906046	999711	906334	1093665	24	093953
37	906155	999709	906445	1093554	23	093844
38	906263	999708	906555	1093444	22	093736
39	906372	999706	906665	1093334	21	093627
40	906480	999705	906775	1093224	20	093519
41	906588	999703	906884	1093115	19	093411
42	906696	999702	906993	1093006	18	093303
43	906803	999700	907102	1092897	17	093196
44	906910	999699	907211	1092788	16	093089
45	907017	999697	907319	1092680	15	092982
46	907124	999696	907427	1092572	14	092875
47	907230	999694	907535	1092464	13	092769
48	907336	999693	907643	1092356	12	092663
49	907442	999691	907750	1092249	11	092557
50	907547	999690	907857	1092142	10	092452
51	907653	999688	907964	1092035	9	092346
52	907758	999687	908070	1091929	8	092241
53	907863	999685	908177	1091822	7	092136
54	907967	999684	908283	1091716	6	092032
55	908071	999682	908389	1091610	5	091928
56	908175	999681	908494	1091505	4	091824
57	908279	999679	908599	1091400	3	091720
58	908383	999678	908705	1091294	2	091616
59	908486	999676	908809	1091190	1	091513
60	908589	999675	908914	1091085	0	091410
	Sine comple.	Sine.	Tangent comple.	Tang.	83	

7	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si.co.
0	908579	999635	908914	1091085	60	091410
1	908692	999673	909018	1090981	59	091307
2	908794	999671	909122	1090877	58	091205
3	908897	999670	909226	1090773	57	091103
4	908999	999668	909330	1090669	56	091000
5	909100	999667	909433	1090566	55	090899
6	909202	999665	909536	1090463	54	090797
7	909303	999664	909639	1090360	53	090696
8	909404	999662	909742	1090257	52	090595
9	909505	999660	909844	1090155	51	090494
10	909606	999659	909946	1090053	50	090393
11	909706	999657	910048	1089951	49	090293
12	909806	999656	910150	1089849	48	090193
13	909906	999654	910251	1089748	47	090093
14	910006	999652	910353	1089646	46	089993
15	910105	999651	910454	1089545	45	089894
16	910204	999649	910555	1089445	44	089795
17	910303	999648	910655	1089344	43	089696
18	910402	999646	910755	1089244	42	089597
19	910500	999644	910856	1089143	41	089499
20	910599	999642	910955	1089044	40	089400
21	910697	999641	911055	1088944	39	089302
22	910795	999640	911155	1088844	38	089204
23	910892	999638	911254	1088745	37	089107
24	910990	999636	911353	1088646	36	089009
25	911087	999635	911452	1088547	35	088912
26	911184	999633	911550	1088449	34	088815
27	911280	999631	911649	1088350	33	088719
28	911377	999630	911747	1088252	32	088622
29	911473	999628	911845	1088154	31	088526
30	911569	999626	911942	1088057	30	088430
	Sine Comp.	Sine.	Tangent Comple.	Tang.	81	

	7	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar.	com. ar.
						of Sine.	of fi. co.
0324	30	911569	999626	911942	1088057	30	058430
0326	31	911665	999625	912040	1087959	29	088334
0328	32	911761	999623	912137	1087862	28	088238
0329	33	911856	999621	912234	1087765	27	088143
0331	34	911951	999610	912331	1087668	26	088048
0332	35	912046	999618	912428	1087571	25	087953
0334	36	912141	999616	912524	1087475	24	087858
0335	37	912236	999615	912621	1087378	23	087763
0337	38	912330	999613	912717	1087282	22	087669
0339	39	912424	999611	912813	1087186	21	087575
0340	40	912518	999610	912908	1087091	20	087481
0342	41	912612	999608	913004	1086995	19	087387
0343	42	912706	999606	913099	1086900	18	087294
0345	43	912799	999604	913194	1086805	17	087200
0347	44	912892	999603	913289	1086710	16	087107
0348	45	912985	999601	913383	1086616	15	087014
0350	46	913078	999599	913478	1086521	14	086921
0351	47	913170	999598	913572	1086427	13	086829
0353	48	913262	999596	913666	1086333	12	086737
0355	49	913355	999594	913760	1086239	11	086644
0356	50	913447	999592	913854	1086145	10	086552
0358	51	913538	999591	913947	1086052	9	086461
0359	52	913630	999589	914040	1085959	8	086369
0361	53	913721	999587	914134	1085866	7	086278
0363	54	913812	999585	914226	1085773	6	086187
0364	55	913903	999584	914319	1085680	5	086096
0366	56	913994	999582	914412	1085587	4	086005
0368	57	914085	999580	914504	1085495	3	085914
0369	58	914175	999578	914598	1085403	2	085824
0371	59	914265	999577	914686	1085311	1	085734
0373	60	914355	999575	914780	1085219	0	085644
		Sine Comple.	Sine.	Tangent Comple.	Tang. 83		

8	Sine.	Sine Comple.	Tang.	Tangent Complem.	com. ar. of fine	com. ar. of fi. co.
0	914355	999575	914780	1085219	60	085644
1	914445	999573	914871	1085128	59	085554
2	914534	999571	914963	1085036	58	085465
3	914624	999569	915054	1084945	57	085375
4	914713	999568	615145	1084854	56	085286
5	914802	999566	915236	1084763	55	085197
6	914891	999564	915326	1084673	54	085108
7	914980	999562	915417	1084582	53	085019
8	915068	999560	915507	1084492	52	084931
9	915156	999559	615597	1084402	51	084843
10	915245	999557	915687	1084312	50	084754
11	915333	999555	915777	1084222	49	084666
12	915420	999553	905867	1084132	48	084579
13	915508	999551	915956	1084043	47	084491
14	915595	999550	916045	1083954	46	084404
15	915682	999548	916134	1083865	45	084317
16	915770	999546	916223	1083776	44	084230
17	915856	999544	916312	1083687	43	084143
18	915943	999542	916400	1083599	42	084056
19	916030	999540	916489	1083510	41	083969
20	916116	999539	916577	1083422	40	083882
21	916202	999537	916665	1083334	39	083797
22	916288	999535	916753	1083246	38	083711
23	916374	999533	916849	1083159	37	083625
24	916459	999531	616929	1083071	36	083540
25	916545	999529	917015	1082984	35	083454
26	916630	999527	917102	1082897	34	083369
27	916715	999525	917189	1082810	33	083284
28	616800	999524	917276	1082723	32	083199
29	916885	999522	917363	1082636	31	083114
30	916970	999520	617449	1082550	30	083029

Sine Comple.	Sine.	Tangent Complem.	Tang.	81
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	8 Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of fine	Com. ar. of Si. co.
30	916970	999520	917449	1082550	30	083029
31	917054	999518	917536	1082463	29	082945
32	917138	999516	917622	1082377	28	082861
33	917223	999514	917708	1082291	27	082776
34	917306	999512	917794	1082205	26	082693
35	917390	999510	917879	1082120	25	082609
36	917474	999508	917965	1082034	24	082525
37	917557	999507	918050	1081949	23	082442
38	917641	999505	918136	1081863	22	082358
39	917724	999503	918221	1081778	21	082275
40	617807	999501	918305	1081694	20	082192
41	917890	999499	918390	1081609	19	082109
42	917972	999497	918475	1081524	18	082027
43	918055	999495	918559	1081440	17	081944
44	918137	999493	918643	1081356	16	081862
45	918219	999491	918728	1081271	15	081780
46	918301	999489	918811	1081188	14	081698
47	918383	999487	918895	1081104	13	081616
48	918465	999485	918979	1081020	12	081534
49	918546	999483	919062	1080937	11	081453
50	918628	999481	919146	1080853	10	081371
51	918709	999479	919229	1080770	9	081290
52	918790	999477	919312	1080687	8	081209
53	918871	999475	919395	1080604	7	081128
54	918951	999473	919478	1080521	6	081048
55	919032	999471	919560	1080439	5	080967
56	919112	999469	919643	1080356	4	080887
57	919193	999467	919725	1080274	3	080806
58	919273	999465	919807	1080192	2	080726
59	919353	999463	919889	1080110	1	080646
60	919433	999461	919971	1080028	0	080566
	Sine Compl.	Sine.	Tangent Complem.	Tang.	81	

9	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of sine	Com. ar. of Si. co.
0	919433	999461	919971	1080028	60080566	000538
1	919512	999459	920052	1079947	59080487	000540
2	919592	999457	920134	1079865	58080404	000542
3	919671	999455	920215	1079784	57080328	000544
4	919751	999453	920297	1079702	56080248	000546
5	919830	999451	920378	1079621	55080169	000548
6	919909	999449	920459	1079540	54080090	000550
7	919987	999447	920540	1079459	53080012	000552
8	920066	999445	920620	1079379	52079933	000554
9	920145	999443	920701	1079298	51079854	000556
10	920223	999441	920781	1079218	50079776	000558
11	920301	999439	920861	1079138	49079686	000560
12	920379	999437	920942	1079057	48079620	000562
13	920457	999435	921022	1078978	47079542	000564
14	920535	999433	921101	1078898	46079464	000566
15	920613	999431	921181	1078818	45079386	000568
16	920690	999429	921261	1078738	44079309	000570
17	920767	999427	921340	1078659	43079232	000572
18	920845	999425	921419	1078580	42079154	000574
19	920922	999423	921498	1078501	41079077	000576
20	920999	999421	921577	1078422	40079000	000578
21	921075	999419	921656	1078343	39078924	000580
22	921152	999417	921735	1078264	38078847	000582
23	921229	999414	921814	1078185	37078770	000585
24	921305	999412	921892	1078107	36078694	000587
25	921381	999410	921970	1078029	35078618	000589
26	921457	999408	922049	1077950	34078542	000591
27	921533	999406	922127	1077872	33078466	000593
28	921609	999404	922205	1077794	32078390	000595
29	921685	999402	922282	1077717	31078314	000597
30	921760	999400	922360	1077639	30078239	000599
	Sine comple.	Sine	Tangent comple.	Tang. 80		

ar. co.	9 <sup>o</sup> Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of si. co.
38	30 921760	999407	922360	1077639	30 078229	000599
40	31 921836	999398	922438	1077561	29 078163	000601
42	32 921911	999396	922515	1077484	28 078088	000603
44	33 921988	999393	922592	1077407	27 078013	000606
46	34 922061	999391	922670	1077329	26 077938	000608
48	35 922136	999389	922747	1077252	25 077863	000610
50	36 922211	999387	922823	1077176	24 077788	000612
52	37 922286	999385	922900	1077099	23 077713	000614
54	38 922360	999383	922977	1077022	22 077639	000616
56	39 922434	999361	923053	1076946	21 077565	000618
58	40 922509	999378	923130	1076869	20 077490	000621
60	41 922583	999376	923206	1076793	19 077416	000623
62	42 922657	999374	923282	1076717	18 077342	000625
64	43 922731	999372	923358	1076641	17 077268	000627
66	44 922804	999370	923434	1076565	16 077195	000629
68	45 922878	999368	923510	1076489	15 077121	000631
70	46 922951	999365	923585	1076414	14 077048	000634
72	47 923025	999363	923661	1076338	13 076974	000636
74	48 923098	999361	923736	1076263	12 076901	000638
76	49 923171	999359	923812	1076187	11 076828	000640
78	50 923244	999357	923887	1076112	10 076755	000642
80	51 923317	999355	923962	1076037	9 076682	000644
82	52 923389	999352	924037	1075962	8 076610	000647
84	53 923462	999350	924111	1075888	7 076537	000649
86	54 923534	999348	924186	1075813	6 076465	000651
88	55 923607	999346	924261	1075738	5 076392	000653
90	56 923679	999344	924335	1075664	4 076320	000655
92	57 923751	999341	924409	1075590	3 076248	000658
94	58 923823	999339	924483	1075516	2 076176	000660
96	59 923895	999337	924557	1075442	1 076104	000662
98	60 923967	999335	924631	1075368	0 076032	000664
	Sine comple.	Sine.	Tangent comple.	Tang.	80	

10	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si. co.	
0	923967	999335	924631	1075368	60	076032	000664
1	924038	999332	924705	1075294	59	075961	000667
2	924110	999330	924779	1075220	58	075889	000669
3	924181	999328	924852	1075147	57	075818	000671
4	924252	999326	924926	1075073	56	075747	000673
5	924323	999323	924999	1075000	55	075676	000676
6	924394	999321	925073	1074926	54	075605	000678
7	924465	999319	925146	1074853	53	075534	000680
8	924536	999317	925219	1074780	52	075463	000682
9	924606	999314	925292	1074708	51	075393	000685
10	924677	999312	925364	1074635	50	075322	000687
11	924747	999310	925437	1074562	49	075252	000689
12	924818	999308	925509	1074490	48	075181	000691
13	924888	999305	925582	1074417	47	075111	000694
14	924958	999303	925654	1074345	46	075041	000696
15	925028	999301	925726	1074273	45	074971	000698
16	925098	999299	925799	1074200	44	074901	000700
17	925167	999296	925870	1074129	43	074832	000703
18	925237	999294	925942	1074057	42	074762	000705
19	925306	999292	926014	1073985	41	074693	000707
20	925376	999289	926086	1073913	40	074623	000710
21	925445	999287	926157	1073842	39	074554	000712
22	925514	999285	926229	1073770	38	074485	000714
23	925583	999282	926300	1073699	37	074416	000717
24	925652	999280	926371	1073628	36	074347	000719
25	925721	999278	926442	1073557	35	074278	000721
26	925789	999275	926513	1073486	34	074210	000724
27	925858	999273	926584	1073415	33	074141	000726
28	925926	999271	926655	1073344	32	074073	000728
29	925995	999268	926726	1073273	31	074004	000731
30	926063	999266	926796	1073203	30	073936	000733
	Sine Comple.	Sine.	Tangent Comple.	Tang.	79		

	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si. co.
664	926063	999266	926796	1073203	30 073926	000733
667	926131	999264	926867	1073132	29 073868	000735
669	926199	999261	926937	1073062	28 073800	000738
671	926267	999259	927007	1072992	27 073732	000740
673	926335	999257	927077	1072922	26 073664	000742
676	926402	999254	927147	1072852	25 073597	000745
678	926470	999252	927217	1072782	24 073529	000747
680	926537	999250	927287	1072712	23 073462	000749
682	926605	999247	927357	1072642	22 073394	000752
685	926672	999245	927426	1072573	21 073327	000754
687	926739	999243	927496	1072503	20 073260	000756
689	926806	999240	927565	1072434	19 073193	000759
691	926873	999238	927635	1072364	18 073126	000761
694	926940	999235	927704	1072295	17 073059	000764
696	927006	999233	927773	1072226	16 072993	000766
698	927073	999231	927842	1072157	15 072926	000768
700	927139	999228	927911	1072088	14 072860	000771
703	927206	999226	927980	1072019	13 072793	000773
705	927272	999223	928048	1071951	12 072727	000776
707	927338	999221	928117	1071882	11 072661	000778
710	927404	999219	928185	1071814	10 072595	000780
712	927470	999216	928254	1071745	9 072529	000783
714	927536	999214	928322	1071677	8 072463	000785
717	927602	999211	928390	1071609	7 072397	000788
719	927668	999209	928458	1071541	6 072331	000790
721	927733	999206	928526	1071473	5 072266	000793
724	927799	999204	928594	1071405	4 072200	000795
726	927864	999202	928662	1071337	3 072135	000797
728	927929	999199	928730	1071269	2 072070	000800
731	927994	999197	928797	1071202	1 072005	000802
733	928059	999194	928865	1071134	0 071940	000805

Sine  
Comple. | Sine. | Tangent  
Complem. | Tang. 79

I	Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar.	com. ar. of fine	com. ar. of fi. co
C	928059	999194	928865	1071134	60	071940	000805
1	928124	999192	928932	1071067	59	071810	000802
2	928189	999189	928999	1071000	58	071875	000800
3	928254	999187	929067	1070932	57	071745	000801
4	928319	999184	929134	1070865	56	071680	000801
5	928383	999182	929201	1070798	55	071616	000801
6	928448	999179	929268	1070731	54	071551	000802
7	928512	999177	929335	1070665	53	071484	000802
8	928576	999174	929401	1070598	52	071423	000802
9	928640	999172	929468	1070531	51	071359	000802
10	928704	999169	929534	1070465	50	071295	000803
11	928768	999167	929601	1070398	49	071231	000803
12	928832	999164	929667	1070332	48	071167	000803
13	928896	999162	929733	1070266	47	071103	000803
14	928960	999159	929800	1070199	46	071039	000804
15	929023	999157	929866	1070133	45	070976	000804
16	929087	999154	929932	1070067	44	070912	000805
17	929150	999152	929998	1070001	43	070845	000805
18	929213	999149	930063	1069936	42	070786	000805
19	929276	999147	930129	1069870	41	070723	000805
20	929339	999144	930195	1069804	40	070660	000805
21	929402	999142	930260	1069739	39	070597	000805
22	929465	999139	930326	1069673	38	070534	000806
23	929528	999137	930391	1069608	37	070471	000806
24	929591	999134	930456	1069543	36	070408	000806
25	929653	999132	930521	1069478	35	070346	000806
26	929716	999129	930586	1069413	34	070283	000807
27	929778	999126	930651	1069348	33	070221	000807
28	929841	999124	930716	1069283	32	070158	000807
29	929903	999121	930781	1069218	31	070096	000807
30	929965	999119	930846	1069153	30	070034	000808
	Sine comple.	Sine.	Tangent comple.	Tang.	78		

	Sine	Sine comple.	Tang.	Tangent comple.	com. ar. of sine.	com. ar. of sin.co.
0	929965	999119	930846	1069052	30070034	000880
1	930027	999116	930910	1069089	29069972	000883
2	930089	999114	930975	1069024	28069910	000885
3	930151	999111	931039	1068960	27069848	000888
4	930213	999108	931104	1068895	26069786	000891
5	930274	999106	931168	1068831	25069725	000893
6	930336	999103	931232	1068767	24069663	000896
7	930397	999101	931296	1068703	23069602	000898
8	930459	999098	931360	1068639	22069540	000901
9	930520	999095	931424	1068575	21069479	000904
10	930581	999092	931488	1068511	20069418	000906
11	930643	999091	931552	1068447	19069356	000909
12	930704	999088	931615	1068384	18069295	000911
13	930765	999085	931679	1068320	17069234	000914
14	930825	999082	931742	1068257	16069174	000917
15	930886	999080	931806	1068193	15069112	000919
16	930947	999077	931869	1068130	14069052	000922
17	930007	999075	931932	1068067	13068992	000924
18	930068	999072	931996	1068003	12068931	000927
19	930128	999069	932059	1067947	11068871	000930
20	930189	999067	932122	1067877	10068810	000932
21	930249	999064	932185	1067814	9068750	000935
22	930309	999061	932247	1067752	8068690	000938
23	930369	999059	932310	1067689	7068630	000940
24	930429	999056	932373	1067626	6068570	000943
25	930489	999053	932435	1067564	5068510	000946
26	930549	999051	932498	1067501	4068450	000948
27	930609	999048	932560	1067439	3068390	000951
28	930668	999045	932623	1067376	2068331	000954
29	930728	999043	932685	1067314	1068271	000956
30	930787	999040	932747	1067252	0068212	000959
Sine Comple.	Sine.	Tangent Complem.	Tang. 81			

12	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. of Sine.
0	931787	999040	932747	1067252	60	068212
1	931847	999037	932809	1067190	59	068152
2	931906	999035	932871	1067128	58	068093
3	931965	999032	932933	1067066	57	068034
4	932024	999029	932995	1067004	56	067975
5	932084	999026	933057	1066942	55	067916
6	932142	999024	933118	1066881	54	067857
7	932201	999021	933180	1066819	53	067798
8	932260	999018	933241	1066758	52	067739
9	932319	999016	933303	1066696	51	067680
10	932378	999013	933364	1066635	50	067621
11	932436	999010	933425	1066574	49	067563
12	932495	999007	933487	1066512	48	067504
13	932553	999005	933548	1066451	47	067446
14	932611	999002	933609	1066390	46	067388
15	932669	998999	933670	1066329	45	067330
16	932728	998996	933731	1066268	44	067271
17	932786	998994	933791	1066208	43	067213
18	932844	998991	933852	1066147	42	067155
19	932902	998988	933913	1066086	41	067097
20	932950	998985	933973	1066026	40	067040
21	933017	998983	934034	1065965	39	066982
22	933075	998980	934094	1065905	38	066924
23	933132	998977	934155	1065844	37	066867
24	933190	998974	934215	1065784	36	066809
25	933247	998972	934275	1065724	35	066752
26	933305	998969	934335	1065664	34	066694
27	933362	998966	934395	1065604	33	066637
28	933419	998963	934455	1065544	32	066580
29	933476	998960	934513	1065484	31	066523
30	933533	998958	934575	1065424	30	066466
	Sine Comple.	Sine.	Tangent Comple.	Tang. 77		

Com. of Sine

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8 Sine	Sine comple.	Tang.	Tangent comple.	com. ar. of sine.	com. ar. of sin.co.
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0	933533	998958	934575	1065424	30066466001041
1	933506	998955	934635	1065364	29066409001044
2	933647	998952	934694	1065305	28066352001047
3	933704	998949	934754	1065245	27066295001050
4	933760	998946	934814	1065185	26066239001053
5	933817	998944	934873	1065126	25066182001055
6	933874	998941	934932	1065067	24066125001058
7	933930	998938	934992	1065007	23066069001061
8	933987	998935	935051	1064948	22066012001064
9	934043	998932	935110	1064889	21065956001067
10	934099	998929	935169	1064830	20065900001070
11	934155	998927	935228	1064771	19065844001072
12	934211	998924	935287	1064712	18065788001075
13	934267	998921	935346	1064653	17065732001078
14	934323	998918	935405	1064594	16065676001081
15	934379	998915	935464	1064535	15065620001084
16	934435	998912	935522	1064477	14065564001087
17	934491	998909	935581	1064418	13065508001090
18	934546	998907	935639	1064360	12065453001092
19	934602	998904	935698	1064301	11065397001095
20	934657	998901	935756	1064243	10065342001098
21	934713	998898	935814	1064185	9065286001101
22	934768	998895	935873	1064126	8065231001104
23	934823	998892	935931	1064068	7065176001107
24	934879	998889	935989	1064010	6065120001112
25	934934	998886	936047	1063952	5065065001113
26	934989	998884	936105	1063894	4065010001115
27	935044	998881	936163	1063836	3064955001118
28	935099	998878	936221	1063779	2064900001121
29	935154	998875	936278	1063721	1064845001124
30	935208	998872	936336	1063663	0064791001127

Sine comple.	Sine	Tangent comple.	Tang.
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13	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. of Si.
0	935208	998872	936236	1063663	60	064791
1	935263	998869	936394	1063605	59	064736
2	935318	998866	936451	1063548	58	064681
3	935372	998863	936509	1063490	57	064627
4	935427	998860	936566	1063433	56	064572
5	935481	998857	936623	1063376	55	064518
6	935535	998854	936681	1063319	54	064464
7	935590	998851	936738	1063261	53	064409
8	935644	998848	936795	1063204	52	064355
9	935698	998845	936852	1063147	51	064301
10	935752	998842	936909	1063090	50	064247
11	935806	998840	936966	1063033	49	064193
12	935860	998837	937023	1062976	48	064139
13	935914	998834	937079	1062920	47	064085
14	935967	998831	937136	1062863	46	064032
15	936021	998828	937193	1062806	45	063978
16	936075	998825	937249	1062750	44	063924
17	936128	998822	937306	1062693	43	063871
18	936182	998819	937362	1062637	42	063817
19	936235	998816	937419	1062580	41	063764
20	936288	998813	937475	1062524	40	063711
21	936342	998810	937531	1062468	39	063657
22	936395	998807	937588	1062411	38	063604
23	936448	998804	937644	1062355	37	063551
24	936501	998801	937700	1062299	36	063498
25	936554	998798	937756	1062240	35	063445
26	936607	998795	937812	1062187	34	063392
27	936660	998792	937868	1062131	33	063339
28	936713	998789	937923	1062076	32	063286
29	936765	998786	937979	1062020	31	063234
30	936818	998783	938035	1061964	30	063181
	Sine Comple.	Sine.	Tangent Comple.	Tang.	79	

	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of St. co.
0	936818	998783	938035	1061964	30063181	001216
1	936871	998780	938091	1061909	29063128	001219
2	936923	998777	938146	1061853	28063076	001222
3	936976	998774	938202	1061797	27063023	001225
4	937028	998770	938257	1061742	26062971	001229
5	937080	998767	938312	1061687	25062919	001232
6	937133	998764	938368	1061631	24062866	001235
7	937185	998761	938423	1061576	23062814	001238
8	937237	998758	938478	1061521	22062762	001241
9	937289	998755	938533	1061466	21062710	001244
10	937341	998752	938588	1061411	20062658	001247
11	937393	998749	938643	1061356	19062606	001250
12	937445	998746	938698	1061301	18062554	001253
13	937496	998743	938753	1061246	17062503	001256
14	937548	998740	938808	1061191	16062451	001259
15	937600	998737	938863	1061136	15062399	001262
16	937651	998734	938917	1061082	14062348	001265
17	937703	998731	938972	1061027	13062296	001268
18	937754	998727	939027	1060973	12062245	001272
19	937806	998724	939081	1060918	11062193	001275
20	937857	998721	939135	1060864	10062142	001278
21	937908	998718	939190	1060809	9062091	001281
22	937960	998715	939244	1060755	8062039	001284
23	938011	998712	939298	1060701	7061988	001287
24	938062	998709	939355	1060644	6061937	001290
25	938113	998706	939407	1060592	5061886	001293
26	938164	998702	939461	1060538	4061835	001297
27	938215	998699	939515	1060484	3061784	001300
28	938266	998696	939569	1060430	2061733	001303
29	938316	998693	939623	1060376	1061683	001305
30	938367	998690	939677	1060322	0061632	001309
	Sine Comple.	Sine.	Tangent Comple.	Tang.	76	

14. Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of si. ca.
0	938367	998690	939673	1060322	60061632
1	938418	998687	939730	1060369	59061581
2	938468	998684	939784	1060415	58061531
3	938519	998680	939838	1060461	57061480
4	938569	998677	939891	1060508	56061430
5	938620	998674	939945	1060554	55061379
6	938670	998671	949998	1060601	54061329
7	938720	998668	940052	1059947	53061279
8	938770	998665	940105	1059894	52061229
9	938821	998661	940159	1059840	51061178
10	938871	998658	940212	1059787	50061128
11	938921	998655	940265	1059734	49061078
12	938971	998652	940318	1059681	48061028
13	939020	998649	940371	1059628	47060979
14	939070	998645	940424	1059575	46060929
15	939120	998642	940477	1059522	45060879
16	939170	998639	940530	1059469	44060829
17	939219	998636	940583	1059416	43060780
18	939269	998633	940636	1059363	42060730
19	939319	998629	940689	1059310	41060680
20	939368	998626	940741	1059258	40060631
21	939417	998623	940794	1059205	39060582
22	939467	998620	940847	1059152	38060532
23	939516	998616	940899	1059100	37060483
24	939565	998613	940952	1059047	36060434
25	939614	998610	941004	1059995	35060385
26	939664	998607	941056	1059943	34060335
27	939713	998603	941109	1059890	33060286
28	939762	998600	941161	1059838	32060237
29	939811	998597	941213	1059786	31060188
30	939859	998594	941265	1059734	30060140
Sine comple.		Sine.	Tangent comple.	Tang. 75	

	14.	Sine.	Sine Comple.	Tang.	Tangent Comple.		Com. ar. of Sine.	Com. ar. of Si.co.
30	932985	998594	941265	1058734	30	060140	001405	
31	933908	998590	941317	1058682	29	060091	001409	
32	934957	998587	941369	1058630	28	060042	001411	
33	940006	998584	941421	1058578	27	059993	001412	
34	940054	998581	941473	1058526	26	059945	001418	
35	940103	998577	941525	1058474	25	059896	001422	
36	940152	998574	941577	1058422	24	059847	001425	
37	940200	998571	941629	1058370	23	059799	001428	
38	940248	998567	941680	1058319	22	059751	001432	
39	940297	998564	941732	1058267	21	059702	001435	
40	940345	998561	941784	1058215	20	059654	001438	
41	940393	998557	941835	1058164	19	059606	001442	
42	940441	998554	941887	1058112	18	059558	001445	
43	940490	998551	941938	1058061	17	059509	001448	
44	940538	998548	941990	1058009	16	059461	001451	
45	940586	998544	942041	1057958	15	059413	001455	
46	940634	998541	942092	1057907	14	059365	001458	
47	940682	998538	942143	1057856	13	059317	001461	
48	940729	998534	942195	1057804	12	059270	001465	
49	940777	998531	942246	1057753	11	059222	001468	
50	940825	998528	942297	1057702	10	059174	001471	
51	940873	998524	942348	1057651	9	059126	001475	
52	940920	998521	942399	1057600	8	059079	001478	
53	940968	998517	942450	1057549	7	059031	001482	
54	941015	998514	942501	1057498	6	058984	001485	
55	941063	998511	942551	1057448	5	058936	001488	
56	941110	998507	942602	1057397	4	058889	001492	
57	941157	998504	942653	1057346	3	058842	001495	
58	941205	998501	942704	1057295	2	058794	001498	
59	941252	998497	942754	1057245	1	058747	001502	
60	941299	998494	942805	1057194	0	058700	001505	

Sine	Sine.	Tangent	Tang.	75
Comple.		Comple.		

15	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of sine.	com. ar. of sin. co.
0	941299	998494	942805	1057194	60	058700
1	941346	998490	942855	1057144	59	058653
2	941393	998487	942906	1057093	58	058606
3	941440	998484	942956	1057043	57	058559
4	941487	998480	943006	1056993	56	058512
5	941534	998477	943057	1056942	55	058465
6	941581	998474	943107	1056892	54	058418
7	941628	998470	943157	1056842	53	058371
8	941675	998467	943207	1056792	52	058324
9	941721	998463	943257	1056742	51	058278
10	941768	998460	943308	1056691	50	058231
11	941814	998456	943358	1056641	49	058185
12	941861	998453	943408	1056592	48	058138
13	941907	998450	943457	1056542	47	058092
14	941954	998446	943507	1056492	46	058045
15	942000	998443	943557	1056442	45	057999
16	942047	998439	943607	1056392	44	057952
17	942093	998436	943657	1056342	43	057906
18	942139	998432	943706	1056293	42	057861
19	942185	998429	943756	1056243	41	057814
20	942231	998425	943805	1056194	40	057768
21	942277	998422	943855	1056144	39	057722
22	942323	998418	943904	1056095	38	057676
23	942369	998415	943954	1056045	37	057630
24	942415	998412	944003	1055996	36	057584
25	942461	998408	944052	1055947	35	057538
26	942507	998405	944102	1055897	34	057492
27	942552	998401	944151	1055848	33	057447
28	942598	998398	944200	1055799	32	057401
29	942644	998394	944249	1055750	31	057355
30	942689	998391	944298	1055701	30	057310
	Sine Comple.	Sine.	Tangent Complem.	Tang.	74	

15	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of Si.co.
30	942689	998391	944298	1055701	30057310	001608
31	942735	998387	944347	1055652	29057264	001612
32	942780	998384	944396	1055603	28057219	001615
33	942826	998380	944445	1055554	27057173	001619
34	942871	998377	944494	1055505	26057128	001622
35	942917	998373	944543	1055456	25057082	001626
36	942962	998369	944592	1055407	24057037	001630
37	943007	998366	944641	1055358	23056992	001633
38	943052	998362	944689	1055310	22056947	001637
39	943097	998359	944738	1055261	21056902	001640
40	943142	998355	944787	1055212	20056857	001644
41	943187	998352	944835	1055164	19056812	001647
42	943232	998348	944884	1055115	18056767	001651
43	943277	998345	944932	1055067	17056722	001654
44	943322	998341	944981	1055018	16056677	001658
45	943367	998338	945029	1054970	15056632	001661
46	943412	998334	945077	1054922	14056587	001665
47	943456	998330	945126	1054873	13056542	001669
48	943501	998327	945174	1054825	12056498	001672
49	943546	998323	945222	1054777	11056453	001676
50	943590	998320	945270	1054729	10056409	001679
51	943635	998316	945318	1054681	9056364	001683
52	943679	998313	945366	1054633	8056320	001686
53	943724	998309	945414	1054585	7056275	001690
54	943768	998305	945462	1054537	6056231	001694
55	943812	998302	945510	1054489	5056187	001697
56	943857	998298	945558	1054441	4056142	001701
57	943901	998295	945606	1054393	3056098	001704
58	943945	998291	945654	1054345	2056054	001708
59	943989	998287	945701	1054298	1056010	001712
60	944033	998284	945749	1054250	0055966	001715

Sine Comple.	Sine.	Tangent Complem.	Tang.	74
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16 Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of Si.co
0944023	998284	945749	1054250	60055966	001715
1944077	998280	945797	1054202	59055922	001719
2944121	998276	945844	1054155	58055878	001723
3944165	998273	945892	1054107	57055834	001726
4944209	998269	945940	1054059	56055790	001730
5944253	998266	945987	1054012	55055746	001734
6944297	998262	946034	1053965	54055702	001737
7944341	998259	946082	1053917	53055658	001741
8944384	998255	946129	1053870	52055615	001744
9944428	998251	946176	1053823	51055571	001748
10944471	998247	946224	1053775	50055528	001752
11944515	998244	946271	1053728	49055484	001755
12944559	998240	946318	1053681	48055440	001759
13944602	998236	946365	1053634	47055397	001763
14944645	998233	946412	1053587	46055354	001766
15944689	998229	946459	1053540	45055310	001770
16944732	998226	946506	1053493	44055267	001774
17944775	998222	946553	1053446	43055224	001777
18944819	998218	946600	1053399	42055180	001781
19944862	998214	946647	1053352	41055137	001785
20944905	998210	946694	1053305	40055094	001789
21944948	998207	946741	1053258	39055051	001793
22944991	998203	946788	1053211	38055008	001796
23945034	998199	946834	1053165	37054965	001800
24945077	998196	946881	1053118	36054922	001804
25945120	998192	946928	1053071	35054879	001807
26945163	998188	946974	1053025	34054836	001811
27945206	998184	947021	1052978	33054793	001815
28945248	998181	947067	1052932	32054751	001819
29945291	998177	947114	1052885	31054708	001823
30945334	998173	947160	1052839	30054665	001827

Sine Comple.	Sine.	Tangent Complem.	Tang.	73
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	16 Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar. of sine	com. ar. of fl. co.
715	30 945334	998173	947160	1052839	30 054665	001826
719	31 945376	998169	947206	1052793	29 054623	001830
723	32 945419	998166	947253	1052746	28 054580	001833
726	33 945461	998162	947299	1052700	27 054538	001837
730	34 945504	998158	947345	1052654	26 054495	001841
734	35 945546	998154	947391	1052608	25 054453	001845
737	36 945589	998151	947438	1052561	24 054410	001848
741	37 945631	998147	947484	1052515	23 054368	001852
744	38 945673	998143	947530	1052469	22 054326	001856
748	39 945716	998139	947576	1052423	21 054283	001860
752	40 945758	998136	947622	1052377	20 054241	001863
755	41 945800	998132	947668	1052331	19 054199	001867
759	42 945842	998128	947714	1052285	18 054157	001871
763	43 945884	998124	947760	1052239	17 054115	001875
766	44 945926	998120	947805	1052194	16 054073	001879
770	45 945968	998117	947851	1052148	15 054031	001882
774	46 946010	998113	947897	1052102	14 053989	001886
777	47 946052	998109	947943	1052056	13 053947	001890
781	48 946094	998105	947988	1052011	12 053905	001894
785	49 946136	998101	948034	1051965	11 053863	001898
788	50 946178	998098	948080	1051919	10 053821	001901
792	51 946219	998094	948125	1051874	9 053780	001905
796	52 946261	998090	948171	1051828	8 053738	001909
1802	53 946303	998086	948216	1051783	7 053696	001913
1805	54 946344	998082	948262	1051737	6 053655	001917
1808	55 946386	998078	948307	1051692	5 053613	001921
1811	56 946427	998075	948352	1051647	4 053572	001924
1814	57 946469	998071	948398	1051601	3 053530	001928
1817	58 946510	998067	948443	1051556	2 053489	001932
1820	59 946552	998063	948488	1051511	1 053447	001936
1823	60 946593	998059	948533	1051466	0 053406	001940

Sine Comple.	Sine.	Tangent Comple.	Tang. 73
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17	Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar. of sine	com. ar. of si. co.
0	946592	998059	948533	1051466	60053406	001940
1	946634	998055	948579	1051420	59053365	001944
2	946676	998051	948624	1051375	58053323	001948
3	946717	998048	948669	1051330	57053282	001951
4	946758	998044	948714	1051285	56053241	001955
5	946799	998040	948759	1051240	55053200	001959
6	946840	998036	948804	1051195	54053159	001963
7	946881	998032	948849	1051150	53053118	001967
8	946922	998028	948894	1051105	52053077	001971
9	946963	998024	948938	1051061	51053036	001975
10	947004	998020	948983	1051016	50052995	001979
11	947045	998016	949028	1050971	49052954	001983
12	947086	998012	949073	1050926	48052913	001987
13	947127	998009	949118	1050881	47052872	001990
14	947167	998005	949162	1050837	46052832	001994
15	947208	998001	949207	1050792	45052791	001998
16	947249	997997	949251	1050748	44052750	002002
17	947289	997993	949296	1050703	43052710	002006
18	947330	997989	949340	1050659	42052669	002010
19	947370	997985	949385	1050614	41052627	002014
20	947411	997981	949429	1050570	40052588	002018
21	947451	997977	949474	1050525	39052548	002022
22	947492	997973	949518	1050481	38052507	002026
23	947532	997969	949562	1050437	37052467	002030
24	947573	997965	949607	1050392	36052426	002034
25	947613	997961	949651	1050348	35052386	002038
26	947653	997957	949695	1050304	34052346	002042
27	947693	997953	949739	1050260	33052306	002046
28	947733	997949	949784	1050215	32052266	002050
29	947774	997945	949828	1050171	31052225	002054
30	947814	997941	949872	1050127	30052185	002058
	Sine Comple.	Sine.	Tangent Comple.	Tang.	72	

ar. co.	17	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of sine	Com. ar. of Si. co.
940	30	947814	997941	949872	1050127	30	052185 002058
944	31	947854	997937	949916	1050083	29	052145 002062
948	32	947894	997933	949960	1050039	28	052105 002066
951	33	947934	997929	950004	1049995	27	052065 002070
955	34	947974	997925	950048	1049951	26	052025 002074
959	35	948014	997921	950092	1049907	25	051985 002078
963	36	948053	997917	950135	1049864	24	051946 002082
967	37	948093	957913	950179	1049829	23	051906 002086
971	38	948133	997909	950223	1049776	22	051866 002090
975	39	948173	997905	950267	1049732	21	051826 002094
979	40	948212	997901	950310	1049689	20	051787 002098
983	41	948252	997897	950354	1049645	19	051747 002102
987	42	948292	997893	950398	1049601	18	051707 002106
990	43	948331	997889	950441	1049558	17	051668 002110
994	44	948371	997885	950485	1049514	16	051628 002114
998	45	948410	997881	950528	1049471	15	051589 002118
002	46	948450	997877	950572	1049427	14	051549 002126
006	47	948489	997873	950615	1049384	13	051510 002122
010	48	948528	997869	950659	1049380	12	051471 002130
014	49	948568	997865	950702	1049297	11	051431 002134
018	50	948607	997861	950746	1049253	10	051392 002138
022	51	948646	997857	950789	1049210	9	051353 002142
026	52	948685	997853	950832	1049167	8	051314 002146
030	53	948725	997849	950875	1049124	7	051274 002150
034	54	948764	997845	950919	1049080	6	051235 002154
038	55	948803	997841	950962	1049037	5	051196 002158
042	56	948842	997837	951005	1048994	4	051157 002162
046	57	948881	997832	951048	1048951	3	051118 002167
050	58	948910	997828	951091	1048908	2	051079 002171
054	59	948959	997824	951134	1048865	1	051040 002175
058	60	948998	997820	951177	1048822	0	051001 002179
		Sine comple.	Sine	Tangent comple.	Tang.	72	

18	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of sine	Com. ar. of Si. co.
0	948998	997810	951177	1048822	60	051001
1	949037	997816	951220	1048779	59	050962
2	949075	997812	951263	1048736	58	050924
3	949114	997808	951306	1048693	57	050885
4	949153	997804	951349	1048650	56	050846
5	949192	997800	951392	1048607	55	050807
6	949230	997795	951434	1048565	54	050769
7	949269	997791	951477	1048522	53	050730
8	949308	997787	951520	1048479	52	050691
9	949346	997783	951562	1048436	51	050653
10	949385	997779	951605	1048394	50	050614
11	949423	997775	951648	1048351	49	050576
12	949462	997771	951690	1048309	48	050537
13	949500	997760	951733	1048266	47	050499
14	949538	997762	951776	1048223	46	050461
15	949577	997758	951818	1048181	45	050422
16	949611	997754	951861	1048138	44	050384
17	949653	997750	951903	1048096	43	050346
18	949691	997746	951945	1048054	42	050308
19	949730	997741	951988	1048011	41	050269
20	949763	997737	952030	1047969	40	050231
21	949806	997733	952072	1047927	39	050193
22	949844	997729	952115	1047884	38	050155
23	949882	997725	952157	1047842	37	050117
24	949920	997720	952199	1047800	36	050079
25	949958	997716	952241	1047758	35	050041
26	949996	997712	952283	1047716	34	050003
27	940034	997708	952325	1047674	33	059965
28	940072	997704	952367	1047632	32	059927
29	940109	997699	952409	1047590	31	059890
30	940147	997695	952451	1047548	30	059852
	Sine comple.	Sine	Tangent comple.	Tang.	71	

8 Sine.	Sine comple.	Tang.	Tangent complem.	com. ar. of Sine.	com. ar. of fl. co.
0 950147	997695	952451	1047548	30 049852	002304
1 950185	997691	952493	1047506	29 049814	002308
2 950223	997687	952535	1047464	28 049776	002312
3 950260	997682	952577	1047422	27 049739	002317
4 950298	997678	952619	1047380	26 049701	002321
5 950335	997674	952661	1047338	25 049664	002325
6 950373	997670	952703	1047296	24 049626	002329
7 950411	997665	952745	1047254	23 049588	002334
8 950448	997661	952786	1047213	22 049551	002338
9 950485	997657	952828	1047171	21 049514	002342
0 950523	997652	952870	1047129	20 049476	002346
1 950560	997648	952911	1047088	19 049439	002351
2 950598	997644	952953	1047046	18 049401	002355
3 950635	997640	952995	1047004	17 049364	002359
4 950672	997636	953036	1046963	16 049327	002363
5 950709	997631	953078	1046921	15 049290	002368
6 950747	997627	953119	1046880	14 049252	002372
7 950784	997623	953161	1046838	13 049215	002376
8 950821	997618	953202	1046797	12 049178	002381
9 950858	997614	953243	1046756	11 049141	002385
0 950895	997610	953285	1046714	10 049104	002389
1 950932	997605	953326	1046673	9 049067	002394
2 950969	997601	953367	1046632	8 049030	002398
3 951006	997597	953409	1046590	7 048993	002402
4 951043	997593	953450	1046549	6 048956	002406
5 951080	997588	953491	1046508	5 048919	002411
6 951117	997584	953532	1046467	4 048882	002415
7 951153	997580	953573	1046426	3 048846	002419
8 951190	997575	953615	1046384	2 048809	002424
9 951227	997571	953656	1046343	1 048772	002428
0 951264	997567	953697	1046302	0 048735	002432

Sine comple. | Sine. | Tangent comple. | Tang. | 71

19	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. com. ar. of Sine. of ft. ca.
0	951264	997567	953697	1046302	60 048735 002432
1	951300	997562	953738	1046261	59 048699 002437
2	951337	997558	953779	1046220	58 048662 002441
3	951374	997553	953820	1046179	57 048625 002446
4	951410	997549	953861	1046138	56 048589 002450
5	951447	997545	953902	1046098	55 048552 002454
6	951483	997540	953942	1046057	54 048516 002459
7	951520	997536	953983	1046016	53 048479 002463
8	951556	997532	954024	1045975	52 048443 002467
9	951593	997527	954065	1045934	51 048407 002472
10	951629	997523	954106	1045893	50 048370 002476
11	951665	997518	954145	1045853	49 048334 002481
12	951701	997514	954187	1045812	48 048298 002485
13	951738	997510	954228	1045771	47 048261 002489
14	951774	997505	954268	1045731	46 048225 002494
15	951810	997401	954309	1045690	45 048189 002498
16	951846	997496	954349	1045650	44 048153 002503
17	951882	997492	954390	1045609	43 048117 002507
18	951919	997488	954431	1045569	42 048080 002511
19	951955	997483	954471	1045528	41 048044 002516
20	951991	997479	954511	1045488	40 048008 002520
21	952027	997474	954552	1045447	39 047972 002525
22	952063	997470	954592	1045407	38 047936 002529
23	952098	997465	954633	1045366	37 047900 002534
24	952134	997461	954673	1045326	36 047865 002538
25	952170	997456	954713	1045286	35 047829 002543
26	952206	997452	954754	1045245	34 047793 002547
27	952242	997448	954794	1045205	33 047757 002551
28	952278	997443	954834	1045165	32 047721 002556
29	952313	997436	954874	1045125	31 047686 002560
30	952349	997434	954914	1045085	30 047650 002565
	Sine comple.	Sine.	Tangent comple.	Tang.	70

19	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of si. co.	
30	952249	997434	954914	1045085	30	047650	002565
31	952385	997430	954955	1045245	29	047614	002569
32	952420	997425	954995	1045004	28	047579	002574
33	952456	997421	955035	1044964	27	047543	002578
34	952491	997416	955075	1044924	26	047508	002583
35	952527	997412	955115	1044884	25	047472	002587
36	952562	997407	955155	1044844	24	047437	002592
37	952598	997403	955195	1044804	23	047401	002596
38	952633	997398	955235	1044764	22	047366	002601
39	952669	997394	955275	1044724	21	047330	002605
40	952704	997389	955314	1044685	20	047295	002610
41	952739	997385	955354	1044645	19	047260	002614
42	952775	997380	955394	1044605	18	047224	002619
43	952810	997376	955434	1044565	17	047189	002624
44	952845	997371	955474	1044525	16	047154	002628
45	952880	997367	955513	1044486	15	047119	002632
46	952916	997362	955553	1044446	14	047083	002637
47	952951	997358	955593	1044406	13	047048	002641
48	952986	997353	955632	1044367	12	047013	002646
49	953021	997348	955672	1044327	11	046978	002651
50	953056	997344	955712	1044287	10	046943	002655
51	953091	997339	955751	1044248	9	046908	002660
52	953126	997335	955791	1044208	8	046873	002664
53	953161	997330	955830	1044169	7	046838	002669
54	953196	997326	955870	1044129	6	046803	002673
55	953231	997321	955909	1044090	5	046768	002678
56	953266	997316	955949	1044050	4	046733	002683
57	953300	997312	955988	1044011	3	046699	002687
58	953335	997307	956027	1043972	2	046664	002692
59	953376	997303	956067	1043932	1	046629	002696
60	953405	997298	956106	1043890	0	046594	002601

Sine. | Sine. | Tangent | Tang. 70

Sine  
comple.

Sine.

Tangent  
comple.

Tang.

70

20	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of ft. co.
0	953405	997298	956106	1043893	60	046594
1	953439	997293	956145	1043854	59	046560
2	953474	997289	956185	1043814	58	046525
3	953509	997284	956224	1043775	57	046490
4	953543	997280	956263	1043736	56	046456
5	953578	997275	956302	1043697	55	046421
6	953612	997270	956341	1043658	54	046387
7	953647	997266	956381	1043618	53	046352
8	953681	997261	956420	1043579	52	046318
9	953716	997257	956459	1043540	51	046283
10	953750	997252	956498	1043501	50	046249
11	953785	997247	956537	1043462	49	046214
12	953819	997243	956576	1043423	48	046180
13	953853	997238	956615	1043384	47	046146
14	953888	997233	956654	1043345	46	046111
15	953922	997229	956693	1043306	45	046077
16	953956	997224	956732	1043267	44	046043
17	953990	997219	956770	1043229	43	046009
18	954024	997215	956809	1043190	42	045975
19	954059	997210	956848	1043151	41	045940
20	954093	997205	956887	1043112	40	045906
21	954127	997201	956926	1043073	39	045872
22	954161	997196	956964	1043035	38	045838
23	954195	997191	957003	1042996	37	045804
24	954229	997187	957042	1042957	36	045770
25	954263	997182	957080	1042919	35	045736
26	954297	997177	957119	1042880	34	045702
27	954331	997172	957158	1042841	33	045668
28	954364	997168	957195	1042803	32	045635
29	954398	997163	957235	1042764	31	045601
30	954432	997158	957273	1042726	30	045567
	Sine comple.	Sine.	Tangent comple.	Tang.	69	

	20 Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	com. ar. of St. co.	
701	30	954432	997158	957277	10427263	045567	002841
706	31	954466	997154	957312	1042687	29045533	002845
710	32	954500	997149	957350	1042649	28045499	002850
719	33	954533	997144	957389	1042610	27045466	002855
715	34	954567	997139	957427	1042572	26045432	002860
724	35	954601	997135	957466	1042533	25045398	002864
729	36	954634	997130	957504	1042495	24045365	002869
733	37	954668	997125	957542	1042457	23045331	002874
738	38	954701	997120	957581	1042418	22045293	002879
742	39	954735	997116	957619	1042380	21045264	002883
747	40	954768	997111	957657	1042342	20045231	002888
752	41	954802	997106	957695	1042304	19045197	002893
756	42	954835	997101	957734	1042265	18045164	002898
761	43	954869	997097	957772	1042227	17045130	002902
766	44	954902	997092	957810	1042189	16045097	002907
770	45	954936	997087	957848	1042151	15045063	002912
775	46	954969	997082	957886	1042113	14045030	002917
780	47	955002	997077	957924	1042075	13044997	002922
784	48	955035	997073	957962	1042037	12044964	002926
789	49	955069	997068	958000	1041999	11044930	002931
794	50	955102	997063	958038	1041961	10044897	002936
798	51	955135	997058	958076	1041923	9044864	002941
803	52	955168	997053	958114	1041885	8044831	002946
808	53	955201	997049	958152	1041847	7044798	002950
812	54	955234	997044	958190	1041809	6044765	002955
817	55	955268	997039	958228	1041771	5044731	002960
822	56	955301	997034	958266	1041733	4044698	002965
827	57	955334	997029	958304	1041695	3044665	002970
831	58	955367	997024	958342	1041657	2044632	002975
836	59	955399	997020	958379	1041620	1044600	002979
841	60	955432	997015	958417	1041582	0044567	002984

Sine Comple.	Sine.	Tangent Comple.	Tang.	69
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21	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	com. ar. of Si.co.
1	955432	997015	958417	1041582	60	044567
2	955465	997010	958455	1041544	59	044534
3	955498	997005	958493	1041506	58	044501
4	955531	997000	958530	1041469	57	044468
5	955564	996995	958568	1041431	56	044435
6	955597	996990	958606	1041393	55	044402
7	955629	996985	958643	1041356	54	044370
8	955662	996981	958681	1041318	53	044337
9	955695	996976	958719	1041280	52	044304
10	955727	996971	958756	1041243	51	044272
11	955760	996966	958794	1041205	50	044239
12	955793	996961	958831	1041168	49	044206
13	955825	996956	958869	1041130	48	044174
14	955858	996951	958906	1041093	47	044141
15	955890	996946	958944	1041055	46	044109
16	955923	996941	958981	1041018	45	044076
17	955955	996937	959018	1040981	44	044044
18	955988	996932	959056	1040943	43	044011
19	956020	996927	959093	1040906	42	043979
20	956053	996922	959130	1040869	41	043946
21	956085	996917	959168	1040831	40	043914
22	956117	996912	959205	1040794	39	043882
23	956150	996907	959242	1040757	38	043849
24	956182	996903	959279	1040720	37	043817
25	956214	996897	959317	1040682	36	043785
26	956246	996892	959354	1040645	35	043753
27	956279	996887	959391	1040608	34	043720
28	956311	996882	959428	1040571	33	043688
29	956343	996877	959465	1040534	32	043656
30	956375	996872	959502	1040497	31	043624
31	956407	996867	959539	1040460	30	043592
Sine Comple.		Sine.	Tangent Comple.	Tang.	68	

ar. co.	21	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Sine.
984	30	956407	996867	959539	1040460	30	043592
989	31	956439	996862	959576	1040423	29	043560
994	32	956471	996857	959613	1040386	28	043528
999	33	956503	996852	959650	1040349	27	043496
004	34	956535	996847	959687	1040312	26	043464
009	35	956567	996842	959724	1040275	25	043432
014	36	956599	996837	959761	1040238	24	043400
018	37	956631	996832	959798	1040201	23	043368
023	38	956663	996827	959835	1040164	22	043336
028	39	956695	996822	959872	1040127	21	043304
033	40	956726	996817	959909	1040090	20	043273
038	41	956758	996812	959945	1040054	19	043241
043	42	956790	996807	959982	1040010	18	043209
048	43	956822	996802	950019	1049980	17	043177
053	44	956853	996797	950056	1039943	16	043146
058	45	956885	996792	950092	1039907	15	043114
062	46	956917	996787	950129	1039870	14	043082
067	47	956948	996782	950166	1039833	13	043051
072	48	956980	996777	950202	1039797	12	043019
077	49	957012	996772	950239	1039760	11	042988
082	50	957043	996767	950276	1039723	10	042956
087	51	957075	996762	950312	1039687	9	042924
092	52	957106	996757	950349	1039650	8	042893
097	53	957138	996752	950385	1039614	7	042861
002	54	957169	996747	950422	1039577	6	042830
007	55	957200	996742	950458	1039541	5	042799
012	56	957232	996736	950495	1039504	4	042767
017	57	957263	996731	950531	1039468	3	042736
022	58	957294	996726	950568	1039431	2	042705
027	59	957326	996721	950604	1039395	1	042673
032	60	957357	996716	950640	1039359	0	042642
		Sine Comple.	Sine.	Tangent Comple.	Tang.	68	

22 Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of sine.	com. ar. of Tang.
0957357	996716	960640	10393596	042642	003318
1957388	996711	960677	10393225	042611	003318
2957420	996706	960713	10392865	042579	003319
3957451	996701	960749	10392505	042548	003320
4957482	996696	960786	10392135	042517	003320
5957513	996691	960822	10391775	042486	003321
6957544	996685	960858	10391415	042455	003321
7957575	996680	960895	10391045	042424	003322
8957606	996675	960931	10390685	042393	003322
9957637	996670	960967	10390325	042362	003323
10957668	996665	961003	10389965	042331	003323
11957699	996660	961039	10389605	042300	003324
12957730	996655	961075	10389245	042269	003324
13957761	996649	961111	10388885	042238	003325
14957792	996644	961148	10388525	042207	003325
15957823	996639	961184	10388165	042176	003326
16957854	996634	961220	10387795	042145	003326
17957885	996629	961256	10387435	042114	003327
18957916	996624	961292	10387075	042083	003327
19957946	996618	961328	10386715	042053	003328
20957977	996613	961364	10386355	042022	003328
21958008	996608	961400	10386005	041991	003329
22958039	996603	961435	10385645	041960	003329
23958069	996598	961471	10385285	041930	003330
24958100	996592	961507	10384925	041899	003330
25958131	996587	961543	10384565	041868	003331
26958161	996582	961579	10384205	041838	003331
27958192	996577	961615	10383845	041807	003332
28958222	996571	961650	10383485	041777	003332
29958253	996566	961686	10383125	041746	003333
30958283	996561	961722	10382765	041716	003333
Sine Comple.	Sine.	Tangent Complem	Tang.	67	12

22	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	com. ar. of Si. co.
30	958283	996561	961721	1038277	30	041716 003438
31	958314	996556	961758	1038241	29	041685 003443
32	958344	996551	961793	1038206	28	041655 003448
33	958375	996545	961829	1038170	27	041624 003454
34	958405	996540	961865	1038134	26	041594 003459
35	958436	996535	961900	1038099	25	041563 003464
36	958466	996530	961936	1038063	24	041533 003469
37	958496	996524	961972	1038027	23	041503 003475
38	958527	996519	962007	1037992	22	041472 003480
39	958557	996514	962043	1037956	21	041442 003485
40	958587	996508	962078	1037921	20	041412 003491
41	958617	996503	962114	1037885	19	041382 003496
42	958648	996498	962149	1037850	18	041351 003501
43	958678	996493	962185	1037814	17	041321 003506
44	958708	996487	962220	1037779	16	041291 003512
45	958738	996482	962256	1037743	15	041261 003517
46	958768	996477	962291	1037708	14	041231 003522
47	958798	996471	962326	1037673	13	041201 003528
48	958828	996466	962362	1037637	12	041171 003533
49	958858	996461	962397	1037602	11	041141 003538
50	958888	996456	962432	1037567	10	041111 003543
51	958918	996450	962468	1037531	9	041081 003549
52	958948	996445	962503	1037496	8	041051 003554
53	958978	996440	962538	1037461	7	041021 003559
54	959008	996434	962574	1037425	6	040991 003565
55	959038	996429	962609	1037390	5	040961 003570
56	959068	996424	962644	1037355	4	040931 003575
57	959098	996418	962679	1037320	3	040901 003581
58	959128	996413	962714	1037285	2	040871 003586
59	959158	996407	962750	1037249	1	040841 003592
60	959187	996402	962785	1037214	0	040812 003597
	Sine Comple.	Sine.	Tangent Comple.	Tang.	67	

23	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of sine	Com. ar. of Si. cr.	23
0	959187	996402	962785	1037214	60	040812	003957
1	959217	996397	962820	1037179	59	040782	003602
2	959247	996391	962855	1037144	58	040752	003608
3	959276	996386	962890	1037109	57	040723	003613
4	959306	996381	962925	1037074	56	040693	003618
5	959336	996375	962960	1037039	55	040663	003624
6	959365	996370	962995	1037004	54	040634	003629
7	959395	996364	963030	1036969	53	040604	003635
8	959425	996359	963065	1036934	52	040574	003640
9	959454	996354	963100	1036899	51	040545	003645
10	959484	996348	963135	1036864	50	040515	003651
11	959513	996343	963170	1036829	49	040486	003656
12	959543	996337	963205	1036794	48	040456	003662
13	959572	996332	963240	1036759	47	040427	003667
14	959602	996327	963275	1036724	46	040397	003672
15	959631	996321	963309	1036690	45	040368	003678
16	959660	996316	963344	1036655	44	040339	003683
17	959690	996310	963379	1036620	43	040309	003689
18	959719	996305	963414	1036585	42	040280	003694
19	959748	996299	963449	1036550	41	040251	003700
20	959778	996294	963483	1036516	40	040221	003705
21	959807	996289	963518	1036481	39	040192	003710
22	959836	996283	963553	1036446	38	040163	003716
23	959866	996278	963587	1036412	37	040133	003721
24	959895	996272	963622	1036377	36	040104	003727
25	959924	996267	963657	1036342	35	040075	003732
26	959953	996261	963691	1036308	34	040046	003738
27	959982	996256	963726	1036273	33	040017	003743
28	960011	996250	963761	1036238	32	039988	003749
29	960040	996245	963795	1036204	31	039959	003754
30	960069	996239	963830	1036169	30	039930	003760
	Sine comple.	Sine	Tangent comple.	Tang.	66		

23	Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar. of sine	com. ar. of si. co.	
30	960069	996239	963830	1036169	30	039930	003760
31	960099	996234	963864	1036135	29	039900	003765
32	960128	996228	963899	1036100	28	039871	003771
33	960157	996223	963933	1036066	27	039842	003776
34	960186	996217	963968	1036031	26	039814	003782
35	960214	996212	964002	1035997	25	039785	003787
36	960243	996206	964037	1035962	24	039756	003793
37	960272	996201	964071	1035928	23	039727	003798
38	960301	996195	964105	1035894	22	039698	003804
39	960330	996190	964140	1035859	21	039669	003809
40	960359	996184	964174	1035825	20	039640	003815
41	960388	996179	964209	1035790	19	039611	003820
42	960416	996173	964243	1035756	18	039583	003826
43	960445	996168	964277	1035722	17	039554	003832
44	960474	996162	964312	1035687	16	039525	003837
45	960503	996156	964346	1035653	15	039496	003843
46	960531	996151	964380	1035619	14	039468	003848
47	960560	996145	964414	1035585	13	039439	003854
48	960589	996140	964449	1035550	12	039410	003859
49	960617	996134	964483	1035516	11	039382	003865
50	960646	996129	964517	1035482	10	039353	003870
51	960675	996123	964551	1035448	9	039324	003876
52	960703	996117	964585	1035414	8	039296	003882
53	960732	996112	964619	1035380	7	039267	003887
54	960760	996106	964654	1035346	6	039239	003893
55	960789	996101	964688	1035311	5	039210	003898
56	960817	996095	964722	1035277	4	039182	003904
57	960846	996089	964756	1035243	3	039153	003910
58	960874	996084	964790	1035209	2	039125	003915
59	960902	996078	964824	1035175	1	039097	003921
60	960931	996073	964858	1035141	0	039068	003926
<div>Sine Comple.</div> <div>Sine.</div> <div>Tangent Comple.</div> <div>Tang.</div> <div>66</div>							

24	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of sine.	com. ar. of sin. co.
0	960931	996073	964858	1035141	60	039068
1	960959	996067	964892	1035107	59	039040
2	960988	996061	964926	1035073	58	039011
3	961016	996056	964960	1035039	57	038983
4	961044	996050	964994	1035005	56	038955
5	961072	996044	965028	1034971	55	038927
6	961101	996039	965061	1034938	54	038898
7	961129	996033	965095	1034904	53	038870
8	961157	996027	965129	1034870	52	038842
9	961185	996022	965163	1034836	51	038814
10	961213	996016	965197	1034802	50	038786
11	961242	996010	965231	1034768	49	038757
12	961270	996005	965265	1034734	48	038729
13	961298	995999	965298	1034701	47	038701
14	961326	995993	965332	1034667	46	038673
15	961354	995988	965366	1034633	45	038645
16	961382	995982	965400	1034599	44	038617
17	961410	995976	965433	1034566	43	038589
18	961438	995971	965467	1034532	42	038561
19	961466	995965	965501	1034498	41	038533
20	961494	995959	965534	1034465	40	038505
21	961522	995953	965568	1034431	39	038477
22	961550	995948	965602	1034397	38	038449
23	961578	995942	965635	1034364	37	038421
24	961605	995936	965669	1034330	36	038394
25	961633	995931	965702	1034297	35	038366
26	961661	995925	965736	1034263	34	038338
27	961689	995919	965769	1034230	33	038310
28	961717	995913	965803	1034196	32	038282
29	961744	995908	965836	1034163	31	038255
30	961772	995902	965870	1034129	30	038227
	Sine Comple.	Sine.	Tangent Complem	Tang.	65	

ar. co.	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of f. co.
926	0961772	995902	961870	1034129	30038227	004097
932	1961800	995896	965903	1034096	29038199	004103
938	2961828	995890	965937	1034062	2803171	004109
943	3961855	995885	965970	1034029	27038144	004115
949	4961883	995879	966004	1033995	26038116	004120
955	5961911	995873	966037	1033962	25038088	004126
960	6961938	995867	966070	1033929	24038061	004132
966	7961966	995861	966104	1033895	23038033	004138
972	8961993	995856	966137	1033862	22038006	004143
977	9962021	995850	966171	1033828	21037978	004149
983	0962048	995844	966204	1033795	20037951	004155
989	1962076	995838	966237	1033762	19037923	004161
994	2962103	995832	966270	1033729	18037896	004167
000	3962131	995827	966304	1033695	17037868	004172
006	4962158	995821	966337	1033662	16037841	004178
011	5962186	995815	966370	1033629	15037813	004184
017	6962213	995809	966403	1033596	14037786	004190
023	7962240	995803	966437	1033562	13037759	004196
028	8962268	995797	966470	1033529	12037731	004202
034	9962295	995792	966503	1033496	11037704	004207
040	0962322	995786	966536	1033463	10037677	004213
046	1962350	995780	966569	1033430	9037649	004219
051	2962377	995774	966602	1033397	8037622	004225
057	3962404	995768	966635	1033364	7037595	004231
063	4962431	995762	966669	1033330	6037568	004237
068	5962459	995756	966702	1033297	5037540	004243
074	6962486	995751	966735	1033264	4037513	004249
080	7962513	995745	966768	1033231	3037486	004254
086	8962540	995739	966801	1033198	2037459	004260
091	9962567	995733	966834	1033165	1037432	004266
097	0962594	995727	966867	1033132	0037405	004272

Sine Comple.	Sine.	Tangent Comple.	Tang.	65
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25	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of sine.	com. ar. of fin.	25
0	962594	995727	966867	1033132	60	037405	00427
1	962621	995721	966900	1033099	59	037378	00427
2	962648	995715	966933	1033066	58	037351	00428
3	962676	995709	966966	1033033	57	037323	00429
4	962703	995703	966999	1033000	56	037296	00429
5	962730	995698	967031	1032968	55	037269	00430
6	962757	995692	967064	1032935	54	037242	00430
7	962783	995686	967097	1032902	53	037216	00431
8	962810	995680	967130	1032869	52	037189	00431
9	962837	995674	967163	1032836	51	037162	00432
10	962864	995668	967196	1032803	50	037135	00432
11	962891	995662	967229	1032770	49	037108	00433
12	962918	995656	967261	1032738	48	037081	00434
13	962945	995650	967294	1032705	47	037054	00434
14	962972	995644	967327	1032672	46	037027	00435
15	962998	995638	967360	1032639	45	037001	00436
16	963025	995632	967392	1032607	44	036974	00436
17	963052	995626	967425	1032574	43	036947	00437
18	963070	995620	967458	1032541	42	036920	00437
19	963105	995614	967491	1032508	41	036994	00438
20	963132	995608	967523	1032476	40	036867	00439
21	963159	995602	967556	1032443	39	036840	00439
22	963185	995596	967589	1032410	38	036814	00440
23	963212	995590	967621	1032378	37	036787	00440
24	963239	995584	967654	1032345	36	036760	00441
25	963265	995578	967686	1032313	35	036734	00442
26	963292	995572	967719	1032280	34	036707	00442
27	963318	995566	967752	1032247	33	036681	00443
28	963345	995560	967784	1032215	32	036654	00443
29	963371	995554	967817	1032182	31	036628	00444
30	963398	995548	967849	1032150	30	036601	00445
	Sine Comple.	Sine.	Tangent Complem	Tang.	64		

(55)

	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	com. ar. of Si. co.
427	963398	995548	967849	1032150	30 036601	004451
427	963424	995542	967882	1032117	29 036575	004457
428	963451	995536	967914	1032085	28 036548	004463
429	963477	995530	967947	1032052	27 036522	004469
429	963504	995524	967979	1032020	26 036495	004475
430	963530	995518	968011	1031988	25 036469	004481
430	963556	995512	968044	1031955	24 036443	004487
431	963583	995506	968076	1031923	23 036416	004493
431	963609	995500	968109	1031890	22 036390	004499
432	963636	995494	968141	1031858	21 036363	004505
433	963662	995488	968173	1031826	20 036337	004511
433	963688	995482	968206	1031793	19 036311	004517
434	963714	995476	968238	1031761	18 036285	004523
434	963741	995470	968270	1031729	17 036258	004529
435	963767	995464	968303	1031696	16 036232	004535
436	963793	995457	968335	1031664	15 036206	004542
436	963819	995451	968367	1031632	14 036180	004548
437	963845	995445	968400	1031599	13 036154	004554
437	963871	995439	968432	1031567	12 036128	004560
438	963898	995433	968464	1031535	11 036101	004566
439	963924	995427	968496	1031503	10 036075	004572
439	963950	995421	968529	1031470	9 036049	004578
440	964076	995415	968561	1031438	8 036023	004584
440	964002	995409	968593	1031406	7 035997	004590
441	964028	995402	968625	1031374	6 035971	004597
442	964059	995396	968657	1031342	5 035945	004603
442	964080	995390	968689	1031310	4 035919	004609
443	964106	995384	968721	1031278	3 035893	004615
443	964132	995378	968754	1031245	2 035867	004621
444	964158	995372	968786	1031213	1 035841	004627
445	964184	995366	968818	1031181	0 035815	004633

Sine Comple.	Sine.	Tangent Comple.	Tang.	64
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26	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of fine	Com. of Sine
0	964184	995366	968818	1031181	60	035815
1	964210	995359	968850	1031149	59	035789
2	964235	995353	968882	1031117	58	035764
3	964261	995347	968914	1031085	57	035738
4	964287	995341	968946	1031053	56	035712
5	964313	995335	968978	1031021	55	035686
6	964339	995328	969010	1030989	54	035660
7	964365	995322	969042	1030957	53	035634
8	964390	995316	969074	1030925	52	035609
9	964416	995310	969106	1030893	51	035583
10	964442	995304	969138	1030861	50	035557
11	964467	995297	969170	1030830	49	035532
12	964493	995291	969201	1030798	48	035506
13	964519	995285	969233	1030766	47	035480
14	964544	995279	969265	1030734	46	035455
15	964570	995273	969297	1030702	45	035429
16	964596	995266	969329	1030670	44	035403
17	964621	995260	969361	1030638	43	035378
18	964647	995254	969392	1030607	42	035352
19	964672	995248	969424	1030575	41	035327
20	964698	995241	969456	1030543	40	035301
21	964723	995235	969488	1030511	39	035276
22	964749	995229	969520	1030479	38	035250
23	964774	995223	969551	1030448	37	035225
24	964800	995216	969583	1030416	36	035199
25	964825	995210	969615	1030384	35	035174
26	964851	995204	969646	1030353	34	035148
27	964876	995197	969678	1030321	33	035123
28	964902	995191	969710	1030289	32	035097
29	964927	995185	969741	1030258	31	035072
30	964952	995179	969773	1030226	30	035047
	Sine comple.	Sine	Tangent comple.	Tang. 63		

26	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of fi. co.
30	964952	995179	969773	1030126	30035047	004820
31	964978	995172	969805	1030194	29035021	004827
32	965003	995166	969836	1030163	28034996	004833
33	965028	995160	969868	1030131	27034971	004839
34	965055	995153	969900	1030099	26034946	004846
35	965079	995147	969931	1030068	25034920	004852
36	965104	995141	969963	1030036	24034895	004858
37	965129	995134	969994	1030005	23034870	004865
38	965154	995128	970026	1029973	22034845	004871
39	965180	995122	970057	1029942	21034819	004877
40	965205	995115	970089	1029910	20034794	004884
41	965230	995109	970120	1029879	19034769	004890
42	965255	995103	970152	1029847	18034744	004896
43	965280	995096	970183	1029816	17034719	004903
44	965305	995090	970215	1029784	16034694	004906
45	965330	995084	970246	1029753	15034669	004915
46	965355	995077	970278	1029721	14034644	004922
47	965380	995071	970309	1029690	13034619	004928
48	965405	995065	970340	1029659	12034594	004935
49	965430	995058	970372	1029627	11034569	004941
50	965455	995052	970403	1029596	10034544	004947
51	965480	995045	970434	1029565	9034519	004954
52	965505	995039	970466	1029533	8034494	004960
53	965530	995033	970497	1029502	7034469	004966
54	965555	995026	970528	1029471	6034444	004973
55	965580	995020	970560	1029439	5034419	004979
56	965605	995013	970591	1029408	4034394	004986
57	965630	995007	970622	1029377	3034369	004992
58	965655	995000	970654	1029345	2034344	004999
59	965679	995994	970685	1029314	1034319	005005
60	965704	995988	970716	1029283	0034295	005011
	Sine comple.	Sine.	Tangent comple.	Tang.	63	

27	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of Si.co.	
0	965704	994988	970716	1029283	60	034295	005011
1	965729	994981	970747	1029252	59	034270	005018
2	965754	994975	970779	1029220	58	034245	005024
3	965778	994968	970810	1029189	57	034221	005031
4	965803	994962	970841	1029158	56	034196	005037
5	965828	994955	970872	1029127	55	034171	005044
6	965853	994949	970903	1029096	54	034146	005050
7	965877	994942	970934	1029065	53	034122	005057
8	965902	994936	970966	1029033	52	034097	005063
9	965927	994929	970997	1029002	51	034072	005070
10	965951	994923	971028	1028971	50	034048	005076
11	965976	994917	971059	1028940	49	034023	005083
12	966000	994910	971090	1028909	48	033999	005089
13	966025	994904	971121	1028878	47	033974	005095
14	966050	994897	971152	1028847	46	033949	005102
15	966074	994891	971183	1028816	45	033925	005108
16	966099	994884	971214	1028785	44	033900	005115
17	966123	994877	971245	1028754	43	033876	005122
18	966148	994871	971276	1028723	42	033851	005128
19	966172	994864	971307	1028692	41	033827	005135
20	966197	994858	971338	1028661	40	033802	005141
21	966221	994851	971369	1028630	39	033778	005148
22	966245	994845	971400	1028599	38	033754	005154
23	966270	994838	971431	1028568	37	033729	005161
24	966294	994832	971462	1028537	36	033705	005167
25	966319	994825	971493	1028506	35	033681	005174
26	966343	994819	971524	1028475	34	033656	005180
27	966367	994812	971555	1028444	33	033632	005187
28	966391	994806	971585	1028413	32	033608	005193
29	966416	994799	971616	1028383	31	033583	005200
30	966440	994792	971647	1028352	30	033559	005207
	Sine Comple.	Sine.	Tangent Complem.	Tang.	62		

27	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si.co.
30	966440	994792	971647	1028352	30	033559 005207
31	966464	994786	971678	1028321	29	033535 005213
32	966489	994779	971709	1028290	28	033510 005220
33	966513	994773	971740	1028259	27	033486 005226
34	966537	994766	971770	1028229	26	033462 005233
35	966561	994759	971801	1028198	25	033438 005240
36	966585	994753	971832	1028167	24	033414 005246
37	966610	994746	971863	1028136	23	033389 005253
38	966634	994740	971894	1028105	22	033365 005259
39	966658	994733	971924	1028075	21	033341 005266
40	966682	994726	971955	1028044	20	033317 005273
41	966706	994720	971986	1028013	19	033293 005279
42	966730	994713	972016	1027983	18	033269 005286
43	966754	994707	972047	1027952	17	033245 005293
44	966778	994700	972078	1027921	16	033221 005299
45	966802	994693	972108	1027891	15	033197 005306
46	966826	994687	972139	1027860	14	033173 005312
47	966850	994680	972170	1027829	13	033149 005319
48	966874	994673	972200	1027799	12	033125 005326
49	966898	994667	972231	1027768	11	033101 005332
50	966922	994660	972262	1027737	10	033077 005339
51	966946	994653	972292	1027707	9	033053 005346
52	966970	994647	972323	1027676	8	033029 005352
53	966994	994640	972353	1027646	7	033005 005359
54	967018	994633	972384	1027615	6	032981 005366
55	967041	994627	972414	1027585	5	032958 005372
56	967065	994620	972445	1027554	4	032934 005379
57	967089	994613	972475	1027524	3	032910 005386
58	967113	994606	972506	1027493	2	032886 005393
59	967137	994600	972536	1027463	1	032862 005399
60	967160	994593	972567	1027432	0	032839 005406
	Sine Comple.	Sine.	Tangent Comple.	Tang.	62	

28 Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar. of sine	com. ar. of fi. co.
0967160	994593	972567	1027432	60 032839	005406
1967184	994586	972597	1027402	59 032815	005413
2967208	994580	972628	1027371	58 032791	005419
3967232	994573	972658	1027341	57 032767	005426
4967255	994566	972689	1027310	56 032744	005433
5967279	994559	972719	1027280	55 032720	005440
6967303	994553	972750	1027249	54 032696	005446
7967326	994546	972780	1027219	53 032673	005453
8967350	994539	972810	1027189	52 032649	005460
9967374	994532	972841	1027158	51 032625	005467
10967397	994526	972871	1027128	50 032602	005473
11967421	994519	972901	1027098	49 032578	005480
12967444	994512	972932	1027067	48 032555	005487
13967468	994505	972962	1027037	47 032531	005494
14967491	994498	972992	1027007	46 032508	005501
15967515	994492	973023	1026976	45 032484	005507
16967538	994485	973053	1026946	44 032461	005514
17967562	994477	973083	1026916	43 032437	005521
18967585	994471	973114	1026885	42 032414	005528
19967609	994465	973144	1026855	41 032390	005534
20967632	994458	973174	1026825	40 032367	005541
21967656	994451	973204	1026795	39 032343	005548
22967679	994444	973235	1026764	38 032320	005555
23967703	994437	973265	1026734	37 032296	005562
24967726	994430	973295	1026704	36 032273	005569
25967749	994424	973325	1026674	35 032250	005575
26967773	994417	973355	1026644	34 032226	005582
27967796	994410	973386	1026613	33 032203	005589
28967819	994403	973416	1026583	32 032180	005596
29967843	994399	973446	1026553	31 032156	005603
30967866	994389	973476	1026523	30 032133	005610
Sine comple.	Sine.	Tangent comple.	Tang.	61	

ar. co.	28	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si.co.	
06	30	967866	994389	973476	1026523	30	03213	005610
13	31	967889	994382	973506	1026493	29	032110	005617
19	32	967912	994376	973536	1026463	28	032087	005623
26	33	967936	994369	973566	1026433	27	032063	005630
33	34	967959	994362	973596	1026403	26	032040	005637
40	35	967982	994355	973626	1026373	25	032017	005644
46	36	968005	994348	973656	1026343	24	031994	005651
53	37	968028	994341	973687	1026312	23	031971	005658
60	38	968051	994334	973717	1026282	22	031948	005665
67	39	968075	994327	973747	1026252	21	031924	005672
73	40	968098	994321	973777	1026222	20	031901	005678
80	41	968121	994314	973807	1026192	19	031878	005685
87	42	968144	994307	973837	1026162	18	031855	005692
94	43	968167	994300	973867	1026132	17	031832	005699
01	44	968190	994293	974897	1026102	16	031809	005706
07	45	968213	994286	974927	1026072	15	031786	005713
14	46	968236	994279	974957	1026042	14	031763	005720
21	47	968259	994272	974986	1026013	13	031740	005727
28	48	968282	994265	974016	1025983	12	031717	005734
34	49	968305	994258	974046	1025953	11	031694	005741
41	50	968328	994251	974076	1025923	10	031671	005748
48	51	968351	994244	974106	1025893	9	031648	005755
55	52	968374	994237	974136	1025863	8	031625	005762
62	53	968397	994230	974166	1025833	7	031602	005769
69	54	968420	994223	974196	1025803	6	031579	005776
76	55	968442	994216	974226	1025773	5	031557	005783
83	56	968465	994209	974255	1025744	4	031534	005790
90	57	968488	994202	974285	1025714	3	031511	005797
97	58	968511	994195	974315	1025684	2	031488	005804
04	59	968534	994188	974345	1025654	1	031465	005811
11	60	968557	994181	974375	1025624	0	031442	005818
		Sine Comple.	Sine.	Tangent Comple.	Tang.	61		

29	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of fi. co.	
0	968557	994181	974375	1025624	60	031442	005818
1	968579	994174	974404	1025595	59	031420	005825
2	968602	994167	974434	1025565	58	031397	005832
3	968625	994160	974464	1025535	57	031374	005839
4	968648	994153	974494	1025505	56	031351	005846
5	968670	994146	974524	1025475	55	031329	005853
6	968693	994139	974553	1025446	54	031306	005860
7	968716	994132	974583	1025416	53	031283	005867
8	968738	994125	974613	1025386	52	031261	005874
9	968761	994118	974642	1025357	51	031238	005881
10	968784	994111	974672	1025327	50	031215	005888
11	968806	994104	974702	1025297	49	031193	005895
12	968829	994097	974731	1025268	48	031170	005902
13	968852	994090	974761	1025238	47	031147	005909
14	968874	994083	974791	1025208	46	031125	005916
15	968897	994076	974820	1025179	45	031102	005923
16	968919	994069	974850	1025149	44	031080	005930
17	968942	994062	974880	1025119	43	031057	005937
18	968964	994055	974909	1025090	42	031035	005944
19	968987	994048	974939	1025060	41	031012	005951
20	969009	994040	974968	1025031	40	030990	005959
21	969032	994033	974998	1025001	39	030967	005966
22	969054	994026	975028	1024971	38	030945	005973
23	969077	994019	975057	1024942	37	030922	005980
24	969099	994012	975087	1024912	36	030900	005987
25	969122	994005	975116	1024883	35	030877	005994
26	969144	994998	975146	1024853	34	030855	006001
27	969166	994991	975175	1024824	33	030833	006008
28	969189	994983	975205	1024794	32	030810	006016
29	969211	994976	975234	1024765	31	030788	006023
30	969233	994969	975264	1024735	30	030766	006030
Sine comple.		Sine.	Tangent comple.	Tang.	60		

29	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of fi. co.
30	969233	993969	975264	1024735	30030766	006030
31	969256	993962	975293	1024706	29030743	006037
32	969278	993955	975323	1024676	28030721	006044
33	969300	993948	975352	1024647	27030699	006051
34	969323	993941	975382	1024617	26030676	006058
35	969345	993933	975411	1024588	25030654	006066
36	969367	993926	975440	1024559	24030632	006073
37	969389	993919	975470	1024529	23030610	006080
38	969412	993912	975499	1024500	22030587	006087
39	969434	993905	975529	1024470	21030565	006094
40	969456	993897	975558	1024441	20030543	006102
41	969478	993890	975587	1024412	19030521	006109
42	969500	993883	975617	1024382	18030499	006116
43	969522	993876	975646	1024353	17030477	006123
44	969545	993869	975675	1024324	16030454	006130
45	969567	993861	975705	1024294	15030432	006138
46	969589	993854	975734	1024265	14030410	006145
47	969611	993847	975763	1024236	13030388	006152
48	969633	993840	975793	1024206	12030366	006159
49	969655	993833	975822	1024177	11030344	006167
50	969677	993825	975851	1024148	10030322	006174
51	969699	993818	975880	1024119	9030300	006181
52	969721	993811	975910	1024089	8030278	006188
53	969743	993804	975939	1024060	7030256	006196
54	969765	993796	975968	1024031	6030234	006203
55	969787	993789	975997	1024002	5030212	006210
56	969809	993782	976027	1023972	4030190	006217
57	969831	993774	976056	1023943	3030168	006225
58	969853	993767	976085	1023914	2030146	006232
59	969875	993760	976114	1023885	1030124	006239
60	969897	993753	976143	1023856	0030103	006246

Sine comple.	Sine.	Tangent comple.	Tang. 60
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30	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of Sine.
0	969897	993752	976142	1023856	60	030103
1	969918	993745	976173	1023826	59	030081
2	969940	993738	976202	1023797	58	030059
3	969962	993731	976231	1023768	57	030037
4	969984	993723	976260	1023739	56	030015
5	970006	993716	976289	1023710	55	029992
6	970028	993709	976318	1023681	54	029971
7	970049	993701	976347	1023652	53	029950
8	970071	993694	976377	1023623	52	029928
9	970093	993687	976406	1023593	51	029906
10	970115	993679	976435	1023564	50	029884
11	970136	993672	976464	1023535	49	029863
12	970158	993665	976493	1023506	48	029841
13	970180	993657	976522	1023477	47	029819
14	970201	993650	976551	1023448	46	029798
15	970223	993643	976580	1023419	45	029776
16	970245	993635	976609	1023390	44	029754
17	970266	993628	976638	1023361	43	029733
18	970288	993620	976667	1023332	42	029711
19	970310	993613	976696	1023303	41	029689
20	970331	993606	976725	1023274	40	029668
21	970353	993598	976754	1023245	39	029646
22	970374	993591	976783	1023216	38	029625
23	970396	993584	976812	1023187	37	029603
24	970417	993576	976841	1023158	36	029582
25	970439	993569	976870	1023129	35	029560
26	970460	993561	976899	1023100	34	029539
27	970482	993554	976928	1023071	33	029517
28	970503	993546	976957	1023042	32	029496
29	970525	993539	976985	1023014	31	029474
30	970546	993532	977014	1023985	30	029453
	Sine Comple.	Sine.	Tangent Complem.	Tang.	59	

	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	com. ar. of Si. co.
20	970546	993532	977014	1021985	30	029453
21	970568	993524	977043	1021956	29	029431
22	970589	993517	977072	1021927	28	029410
23	970611	993509	977101	1021898	27	029388
24	970632	993502	977130	1021869	26	029367
25	970653	993494	977159	1021840	25	029346
26	970675	993487	977188	1021811	24	029324
27	970696	993479	977216	1021783	23	029303
28	970718	993472	977245	1021754	22	029281
29	970739	993464	977274	1021725	21	029260
30	970760	993457	977303	1021696	20	029239
31	970781	993449	977332	1021667	19	029218
32	970803	993442	977360	1021639	18	029196
33	970824	993434	977389	1021610	17	029175
34	970845	993427	977418	1021581	16	029154
35	970866	993419	977447	1021552	15	029133
36	970888	993412	977475	1021524	14	029111
37	970909	993404	977504	1021495	13	029090
38	970930	993397	977533	1021466	12	029069
39	970951	993389	977562	1021437	11	029048
40	970972	993382	977590	1021409	10	029027
41	970994	993374	977619	1021380	9	029005
42	971015	993367	977648	1021351	8	028984
43	971036	993359	977676	1021323	7	028963
44	971057	993352	977705	1021294	6	028942
45	971078	993344	977734	1021265	5	028921
46	971099	993336	977762	1021237	4	028900
47	971120	993329	977791	1021208	3	028879
48	971141	993321	977820	1021179	2	028858
49	971162	993314	977848	1021151	1	028837
50	971183	993306	977877	1021122	0	028816

Sine Comple.	Sine.	Tangent Comple.	Tang.	59
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31 Sine.	Sine Comple.	Tang.	Tangens Comple.	com. ar. com. a. of sine of fi. co.			
0	971182	993306	977877	10212260	02816	006693	
1	971204	993298	977905	1021694	59	028795	006701
2	971225	993291	977934	1022065	58	028774	006708
3	971246	993283	977963	1022036	57	028753	006716
4	971267	993276	977991	1022008	56	028732	006725
5	971288	993268	978020	1021979	55	028711	006731
6	971309	993260	978048	1021951	54	028690	006739
7	971330	993253	978077	1021922	53	028669	006746
8	971351	993245	978106	1021893	52	028648	006754
9	971372	993238	978134	1021865	51	028627	006761
10	971393	993230	978163	1021836	50	028606	006769
11	971414	993222	978191	1021808	49	028585	006777
12	971435	993215	978220	1021779	48	028564	006784
13	971456	993210	978248	1021751	47	028543	006791
14	971476	993199	978277	1021722	46	028521	006800
15	971497	993192	978305	1021694	45	028502	006807
16	971518	993184	978334	1021665	44	028481	006815
17	971539	993176	978362	1021637	43	028460	006823
18	971560	993169	978391	1021608	42	028439	006830
19	971581	993161	978419	1021580	41	028419	006838
20	971601	993155	978444	1021552	40	028398	006846
21	971622	993146	978476	1021523	39	028377	006853
22	971643	993138	978500	1021495	38	028356	006861
23	971663	993130	978533	1021466	37	028336	006869
24	971684	993122	978561	1021438	36	028315	006877
25	971705	993115	978590	1021409	35	028294	006884
26	971725	993107	978618	1021381	34	028274	006891
27	971746	993099	978646	1021353	33	028253	006900
28	971767	993092	978671	1021324	32	028232	006907
29	971787	993084	978703	1021296	31	028212	006915
30	971808	993076	978731	1021268	30	028191	006922
Sine Comple.	Sine.	Tangens Comple.	Tang.	58			

	31	Sine.	Sine comple.	Tang.	Tangent comple.		com. ar.	com. ar.
							of Sine.	of fi. co.
593	30	971808	993076	978731	1021268	30	028191	006923
01	31	971829	993068	978760	1021239	29	028170	006931
08	32	971849	993061	978788	1021211	28	028150	006938
16	33	971870	993053	978816	1021183	27	028129	006946
23	34	971890	993045	978845	1021154	26	028109	006954
31	35	971911	993037	978872	1021126	25	028088	006962
39	36	971931	993030	978901	1021098	24	028068	006969
46	37	971952	993022	978930	1021069	23	028047	006977
54	38	971973	993014	978958	1021041	22	028027	006985
61	39	971993	993006	978986	1021013	21	028006	006993
69	40	972013	992998	979015	1020984	20	027986	007001
77	41	972034	992991	979043	1020956	19	027965	007008
84	42	972054	992983	979071	1020928	18	027945	007016
92	43	972075	992975	979099	1020900	17	027924	007024
00	44	972095	992967	979128	1020871	16	027904	007032
07	45	972116	992959	979156	1020843	15	027883	007040
15	46	972136	992952	979184	1020815	14	027863	007047
23	47	972157	992944	979212	1020787	13	027842	007055
30	48	972177	992936	979241	1020758	12	027822	007063
38	49	972197	992928	979269	1020730	11	027802	007071
46	50	972218	992920	979297	1020702	10	027781	007079
53	51	972238	992912	979325	1020674	9	027761	007087
61	52	972258	992905	979353	1020646	8	027741	007094
69	53	972279	992897	979381	1020618	7	027720	007102
77	54	972299	992889	979410	1020589	6	027700	007110
84	55	972319	992881	979438	1020561	5	027680	007118
92	56	972340	992873	979466	1020533	4	027660	007126
00	57	972360	992865	979494	1020505	3	027639	007124
07	58	972380	992857	979522	1020477	2	027619	007142
15	59	972400	992849	979550	1020449	1	027599	007150
23	60	972420	992842	979578	1020421	0	027579	007157
		Sine comple.	Sine.	Tangent comple.	Tang.	58		

32	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of line.	com. ar. of fin. ca.
0	972420	992842	979578	1020421	60	027579
1	972441	992834	979607	1020392	59	027558
2	972461	992826	979635	1020364	58	027538
3	972481	992818	979663	1020336	57	027518
4	972501	992810	979691	1020308	56	027498
5	972521	992802	979719	1020280	55	027478
6	972542	992794	979747	1020252	54	027457
7	972562	992786	979775	1020224	53	027437
8	972582	992778	979803	1020196	52	027417
9	972602	992770	979831	1020168	51	027397
10	972622	992762	979859	1020140	50	027377
11	972642	992754	979887	1020112	49	027357
12	972662	992746	979915	1020084	48	027337
13	972682	992738	979943	1020056	47	027317
14	972702	992731	979971	1020028	46	027297
15	972722	992723	979999	1020000	45	027277
16	972742	992715	980027	1019972	44	027257
17	972762	992707	980055	1019944	43	027237
18	972782	992699	980083	1019916	42	027217
19	972802	992691	980111	1019888	41	027197
20	972822	992683	980139	1019860	40	027177
21	972842	992675	980167	1019832	39	027157
22	972862	992667	980195	1019804	38	027137
23	972882	992659	980223	1019776	37	027117
24	972902	992651	980251	1019748	36	027097
25	972922	992643	980279	1019720	35	027077
26	972942	992635	980307	1019692	34	027057
27	972962	992627	980335	1019664	33	027037
28	972981	992619	980362	1019637	32	027018
29	972001	992610	980390	1019609	31	027998
30	972021	992602	980418	1019581	30	027978
	Sine Comple.	Sine.	Tangent Complem	Tang.	57	

32	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of fi. co.
30	973021	992602	980418	1019581	30026978	007397
31	973041	992594	980446	1019553	29026958	007405
32	973061	992586	980474	1019525	28026938	007413
33	973081	992578	980502	1019497	27026918	007421
34	973100	992570	980530	1019469	26026899	007429
35	973120	992562	980558	1019441	25026879	007437
36	973140	992554	980585	1019414	24026859	007445
37	973160	992546	980613	1019386	23026839	007453
38	973179	992538	980641	1019358	22026820	007461
39	973199	992530	980669	1019330	21026800	007469
40	973219	992522	980697	1019302	20026780	007477
41	973239	992514	980724	1019275	19026760	007485
42	973258	992505	980752	1019247	18026741	007494
43	973278	992497	980780	1019219	17026721	007502
44	973298	992489	980808	1019191	16026701	007510
45	973317	992481	980836	1019163	15026682	007518
46	973337	992473	980863	1019136	14026662	007526
47	973356	992465	980891	1019108	13026643	007534
48	973376	992457	980919	1019080	12026623	007542
49	973396	992449	980947	1019052	11026603	007550
50	973415	992440	980974	1019025	10026584	007559
51	973435	992432	981002	1018997	9026564	007567
52	973454	992424	981030	1018969	8026545	007575
53	973474	992416	981057	1018942	7026525	007583
54	973493	992408	981085	1018914	6026506	007591
55	973513	992400	981113	1018886	5026486	007599
56	973532	992391	981141	1018858	4026467	007608
57	973552	992383	981168	1018831	3026447	007616
58	973571	992375	981196	1018803	2026428	007624
59	973591	992367	981224	1018775	1026408	007632
60	973610	992359	981251	1018748	0026389	007640
	Sine comple.	Sine.	Tangent comple.	Tang.	57	

33	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of line.	com. ar. of sin. co.
0	973610	992359	981251	1018748	60	026389
1	973630	992350	981279	1018720	59	026369
2	973649	992342	981307	1018692	58	026350
3	973669	992334	981334	1018665	57	026330
4	973688	992326	981362	1018637	56	026311
5	973707	992318	981389	1018610	55	026292
6	973727	992309	981417	1018582	54	026272
7	973746	992301	981445	1018554	53	026253
8	973766	992293	981472	1018527	52	026233
9	973785	992285	981500	1018499	51	026214
10	973804	992276	981527	1018472	50	026195
11	973824	992268	981555	1018444	49	026175
12	973843	992260	981583	1018416	48	026156
13	973862	992252	981610	1018389	47	026137
14	973882	992243	981638	1018361	46	026117
15	973901	992235	981665	1018334	45	026098
16	973920	992227	981693	1018306	44	026079
17	973939	992218	981720	1018279	43	026060
18	973959	992210	981748	1018251	42	026040
19	973978	992202	981775	1018224	41	026021
20	973997	992194	981803	1018196	40	026002
21	974016	992185	981830	1018169	39	025983
22	974035	992177	981858	1018141	38	025964
23	974055	992169	981885	1018114	37	025944
24	974074	992160	981913	1018086	36	025925
25	974093	992152	981940	1018059	35	025906
26	974112	992144	981968	1018031	34	025887
27	974131	992135	981995	1018004	33	025868
28	974150	992127	982023	1017976	32	025849
29	974169	992119	982050	1017949	31	025830
30	974188	992110	982078	1017921	30	025811
	Sine Comple.	Sine.	Tangent Complem.	Tang.	56	

ar. co.	33 Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of Si.co.
40	30 974188	992110	982278	1017921	3 025811	007889
49	31 974208	992102	982105	1017894	29 025791	007897
57	32 974227	992093	982133	1017866	28 025732	007906
65	33 974246	992085	982160	1017839	27 025753	007914
73	34 974265	992077	982188	1017811	26 025734	003922
81	35 974284	992068	982215	1017784	25 025715	007931
90	36 974303	992060	982242	1017757	24 025696	007939
98	37 974322	992052	982270	1017729	23 025677	007948
06	38 974341	992043	982297	1017702	22 025658	007956
14	39 974360	992035	982325	1017674	21 025639	007964
23	40 974379	992026	982352	1017647	20 025620	007973
31	41 974398	992018	982379	1017620	19 025601	007986
39	42 974417	992009	982407	1017592	18 025582	007990
47	43 974436	992001	982434	1017565	17 025563	007998
56	44 974454	991993	982461	1017538	16 025545	008006
64	45 974473	991984	982489	1017510	15 025526	008015
72	46 974492	991976	982516	1017483	14 025507	008023
81	47 974511	991967	982543	1017456	13 025488	008032
89	48 974530	991959	98257	1017428	12 025469	008040
97	49 974549	991950	982598	1017401	11 025450	008049
05	50 974568	991942	982625	1017374	10 025431	008057
14	51 974587	991933	982653	1017346	9 025412	008066
22	52 974605	991925	982680	1017319	8 025394	008074
30	53 974624	991916	982707	1017292	7 025375	008083
39	54 974643	991908	982735	1017264	6 025356	008091
47	55 974662	991899	982762	1017237	5 025337	008100
55	56 974681	991891	982789	1017210	4 025318	008108
64	57 974699	991882	982816	1017183	3 025300	008117
72	58 974718	991874	982844	1017155	2 025281	008125
80	59 974737	991865	982871	1017128	1 025262	008133
89	60 974756	991857	982898	1017101	0 025243	008142
	Sine Comple.	Sine.	Tangent Complem.	Tang.	56	

34	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of si. co.
0	974756	991857	982898	1017101	60025243	00812
1	974774	991848	982925	1017074	59025225	008151
2	974793	991840	982953	1017046	58025206	008159
3	974812	991831	982980	1017019	57025187	008168
4	974830	991823	983007	1016992	56025169	008176
5	974849	991814	983034	1016965	55025150	008185
6	974868	991806	983062	1016937	54025131	008193
7	974886	991797	983089	1016910	53025113	008202
8	974905	991789	983116	1016883	52025094	008210
9	974924	991780	983143	1016856	51025075	008219
10	974942	991771	983170	1016829	50025057	008228
11	974961	991763	983198	1016801	49025038	008236
12	974980	991754	983225	1016774	48025019	008245
13	974998	991746	983252	1016747	47025001	008253
14	975017	991737	983279	1016720	46024982	008262
15	975035	991729	983306	1016692	45024964	008271
16	975054	991720	983333	1016666	44024945	008279
17	975072	991711	983361	1016638	43024927	008288
18	975091	991703	983388	1016611	42024908	008296
19	975109	991694	983415	1016584	41024890	008305
20	975128	991685	983442	1016551	40024871	008314
21	975146	991677	983469	1016530	39024853	008322
22	975165	991668	983496	1016503	38024834	008331
23	975183	991660	983523	1016476	37024816	008339
24	975202	991951	983550	1016449	36024797	008348
25	975220	991642	983578	1016421	35024779	008357
26	975239	991634	983605	1016394	34024760	008365
27	975257	991625	983632	1016367	33024742	008374
28	975276	991616	983659	1016340	32024723	008383
29	975294	991608	983686	1016313	31024705	008391
30	975312	991599	983713	1016286	30024687	008400
	Sine comple.	Sine.	Tangent comple.	Tang.	55	

34	Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar.	com. ar. of sine	com. ar. of si. co.
30	975312	991599	983713	1016186	30	024687	008400
31	975331	991590	983740	1016259	29	024668	008409
32	975349	991582	983767	1016232	28	024650	008418
33	975367	991573	983794	1016205	27	024632	008426
34	975386	991564	983821	1016178	26	024613	008435
35	975404	991555	983848	1016151	25	024595	008444
36	975422	991547	983875	1016124	24	024577	008452
37	975441	991538	983902	1016097	23	024558	008461
38	975459	991529	983929	1016070	22	024540	008460
39	975477	991521	983956	1016043	21	024522	008478
40	975496	991512	983983	1016016	20	024503	008487
41	975514	991503	984010	1015989	19	024485	008496
42	975532	991494	984037	1015962	18	024467	008505
43	975550	991486	984064	1015935	17	024449	008513
44	975565	991477	984091	1015908	16	024430	008522
45	975587	991468	984118	1015881	15	024412	008531
46	975605	991459	984145	1015854	14	024394	008540
47	975623	991450	984172	1015827	13	024376	008549
48	975641	991442	984199	1015800	12	024358	008557
49	975659	991433	984226	1015773	11	024340	008566
50	975678	991424	984253	1015746	10	024321	008575
51	975696	991415	984280	1015719	9	024303	008584
52	975714	991407	984307	1015692	8	024285	008592
53	975732	991398	984334	1015665	7	024267	008601
54	975750	991389	984361	1015638	6	024249	008610
55	975768	991380	984388	1015611	5	024231	008619
56	975786	991371	984415	1015584	4	024213	008628
57	975804	991361	984441	1015558	3	024195	008637
58	975823	991354	984468	1015531	2	024176	008645
59	975841	991345	984495	1015504	1	024158	008654
60	975859	991336	984522	1015577	0	024140	008663

Sine Comple.	Sine.	Tangent Comple.	Tang. CO
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35	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	com. ar. of Si. co	
0	975859	991336	984522	1015477	60	024140	004663
1	975877	991327	984549	1015450	59	024132	008672
2	975895	991318	984576	1015423	58	024104	008681
3	975913	991309	984603	1015396	57	024086	008690
4	975931	991301	984630	1015369	56	024068	008698
5	975949	991292	984657	1015342	55	024050	008707
6	975967	991283	984683	1015316	54	024032	008716
7	975985	991274	984710	1015289	53	024014	008725
8	976003	991265	984737	1015262	52	023996	008734
9	976021	991256	984764	1015235	51	023978	008743
10	976038	991247	984791	1015208	50	023966	008752
11	976056	991238	984818	1015181	49	023943	008761
12	976074	991229	984844	1015155	48	023925	008770
13	976092	991220	984871	1015128	47	023907	008779
14	976110	991212	984898	1015101	46	023889	008787
15	976128	991203	984925	1015074	45	023871	008796
16	976146	991194	984952	1015047	44	023853	008805
17	976164	991185	984978	1015021	43	023835	008814
18	976182	991176	985005	1014994	42	023817	008823
19	976199	991167	985032	1014967	41	023800	008832
20	976217	991158	985059	1014940	40	023782	008841
21	976235	991149	985086	1014913	39	023764	008850
22	976253	991140	985112	1014887	38	023746	008859
23	976271	991131	985139	1014860	37	023728	008868
24	976288	991122	985166	1014833	36	023711	008877
25	976306	991113	985193	1014806	35	023693	008886
26	976324	991104	985219	1014780	34	023675	008895
27	976342	991095	985246	1014753	33	023657	008904
28	976359	991086	985273	1014726	32	023640	008913
29	976377	991077	985300	1014699	31	023622	008922
30	976395	991068	985326	1014673	30	023604	008931
	Sine Comple.	Sine.	Tangent Comple.	Tang.	54		

	35	Sine.	Sine Comple.	Tang.	Tangent Comple.		Com. ar. of Sine.	Com. ar. of Si.co.
466	30	976395	991068	985326	1014673	30	023604	008931
867	31	976413	991059	985353	1014646	29	023586	008940
868	32	976430	991050	985380	1014619	28	023569	008949
869	33	976448	991041	985406	1014593	27	023551	008958
869	34	976466	991032	985433	1014566	26	023533	008967
870	35	976482	991023	985460	1014539	25	023516	008976
871	36	976501	991014	985487	1014512	24	023498	008985
872	37	976519	991005	985513	1014486	23	023480	008994
873	38	976536	990996	985540	1014459	22	023463	009003
874	39	976554	990987	985567	1014432	21	023445	009012
875	40	976570	990978	985593	1014406	20	023428	009021
876	41	976589	990969	985620	1014379	19	023410	009030
877	42	976607	990960	985647	1014352	18	023392	009039
878	43	976624	990950	985673	1014326	17	023375	009049
879	44	976642	990941	985700	1014299	16	023357	009058
880	45	976659	990932	985727	1014272	15	023340	009067
881	46	976677	990923	985753	1014246	14	023322	009076
882	47	976694	990914	985780	1014219	13	023305	009085
883	48	976712	990905	985806	1014193	12	023287	009094
884	49	976729	990896	985833	1014166	11	023270	009103
885	50	976747	990883	985860	1014139	10	023252	009112
886	51	976764	990878	985886	1014113	9	023235	009122
887	52	976782	990869	985913	1014086	8	023217	009130
888	53	976799	990859	985940	1014059	7	023200	009140
889	54	976817	990850	985966	1014033	6	023182	009149
890	55	976834	990841	985993	1014006	5	023165	009158
891	56	976852	990832	986019	1013980	4	023147	009167
892	57	976869	990823	986046	1013953	3	023130	009176
893	58	976887	990814	986072	1013927	2	023112	009185
894	59	976904	990804	986099	1013900	1	023095	009195
895	60	976921	990795	986126	1013873	0	023078	009204
		Sine Comple.	Sine.	Tangent Comple.	Tang.	54		

36	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of fine	Com. ar. of Si. co
0	976921	990795	986126	1013873	60	023078
1	976939	990786	986152	1013847	59	023060
2	976956	990777	986179	1013820	58	023043
3	976973	990768	986205	1013794	57	023026
4	976991	990759	986232	1013767	56	023008
5	977008	990749	986258	1013741	55	022991
6	977026	990740	986285	1013714	54	022973
7	977043	990731	986311	1013688	53	022956
8	977060	990722	986338	1013661	52	022939
9	977077	990712	986365	1013635	51	022922
10	977095	990703	986391	1013608	50	022904
11	977112	990694	986418	1013581	49	022887
12	977129	990685	986444	1013555	48	022870
13	977147	990675	986471	1013528	47	022852
14	977164	990666	986497	1013502	46	022835
15	977181	990657	986524	1013475	45	022818
16	977198	990648	986550	1013449	44	022801
17	977215	990638	986577	1013422	43	022784
18	977233	990629	986603	1013396	42	022766
19	977250	990620	986629	1013370	41	022749
20	977267	990611	986656	1013343	40	022732
21	977284	990601	986682	1013317	39	022715
22	977301	990592	986709	1013290	38	022698
23	977319	990583	986735	1013264	37	022681
24	977336	990573	986762	1013237	36	022663
25	977353	990564	986788	1013211	35	022646
26	977370	990555	986815	1013184	34	022629
27	977387	990545	986841	1013158	33	022612
28	977404	990536	986868	1013131	32	022595
29	977421	990527	986894	1013105	31	022578
30	977438	990517	986920	1013079	30	022561
	Sine comple.	Sine	Tangent comple.	Tang.	53	

	36	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si.co.
30	977438	990517	986920	1013079	20	022561	009484
31	977455	990508	986947	1013052	29	022544	009491
32	977472	990499	986973	1013026	28	022527	009500
33	977489	990489	987000	1012999	27	022510	009510
34	977506	990480	987026	1012973	26	022493	009519
35	977523	990471	987056	1012947	25	022470	009528
36	977541	990461	987079	1012920	24	022458	009538
37	977558	990452	987105	1012894	23	022441	009547
38	977575	990442	987132	1012867	22	022424	009557
39	977591	990433	987158	1012841	21	022408	009566
40	977608	990424	987184	1012815	20	022391	009575
41	977625	990414	987211	1012788	19	022374	009585
42	977641	990405	987237	1012762	18	022357	009594
43	977659	990395	987263	1012736	17	022340	009604
44	977676	990386	987290	1012709	16	022323	009613
45	977693	990377	987316	1012683	15	022306	009622
46	977710	990367	987343	1012656	14	022289	009632
47	977727	990358	987369	1012630	13	022272	009641
48	977744	990348	987395	1012604	12	022255	009651
49	977761	990339	987422	1012577	11	022238	009660
50	977778	990329	987448	1012551	10	022221	009670
51	977795	990320	987474	1012525	9	022204	009679
52	977811	990310	987501	1012498	8	022188	009689
53	977828	990301	987527	1012472	7	022171	009698
54	977845	990291	987553	1012446	6	022154	009708
55	977862	990282	987579	1012420	5	022137	009717
56	977879	990272	987606	1012393	4	022120	009727
57	977895	990263	987632	1012367	3	022104	009736
58	977912	990253	987658	1012341	2	022087	009746
59	977929	990244	987685	1012314	1	022070	009755
60	977946	990234	987711	1012288	0	022053	009765
		Sine Comple.	Sine.	Tangent Comple.	Tang.	53	

37	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of sine	Com. ar. of Si. co
0	977946	990234	987711	1012288	60	022053
1	977963	990225	987737	1012262	59	022036
2	977979	990215	987764	1012236	58	022020
3	977996	990206	987790	1012209	57	022003
4	978013	990196	987816	1012183	56	021986
5	978030	990187	987842	1012157	55	021970
6	978046	990177	987869	1012130	54	021953
7	978063	990168	987895	1012104	53	021936
8	978080	990158	987921	1012078	52	021919
9	978096	990148	987947	1012052	51	021903
10	978113	990139	987974	1012025	50	021886
11	978130	990129	988000	1011999	49	021869
12	978146	990120	988026	1011973	48	021853
13	978163	990110	988052	1011947	47	021836
14	978180	990101	988079	1011921	46	021819
15	978196	990091	988105	1011894	45	021808
16	978213	990081	988131	1011868	44	021786
17	978229	990072	988157	1011842	43	021770
18	978246	990062	988183	1011816	42	021753
19	978263	990052	988210	1011789	41	021736
20	978279	990043	988236	1011763	40	021720
21	978296	990033	988262	1011737	39	021703
22	978312	990024	988288	1011711	38	021687
23	978329	990014	988314	1011685	37	021670
24	978345	990004	988341	1011658	36	021654
25	978362	989995	988367	1011632	35	021637
26	978378	989985	988393	1011606	34	021621
27	978395	989975	988419	1011580	33	021604
28	978411	989966	988445	1011554	32	021588
29	978428	989956	988471	1011528	31	021571
30	978444	989946	988498	1011501	30	021555
	Sine comple.	Sine	Tangent comple.	Tang.	52	

	37	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of fi. co.	
765	30	978444	989946	988499	1011501	30	021555	010053
774	31	978461	989936	988524	1011475	29	021538	010063
784	32	978477	989927	988550	1011449	28	021522	010072
793	33	978494	989917	988576	1011423	27	021505	010082
803	34	978510	989907	988602	1011397	26	021489	010092
812	35	978526	989898	988628	1011371	25	021472	010101
822	36	978543	989888	988654	1011345	24	021456	010111
831	37	978559	989878	988681	1011318	23	021440	010121
841	38	978576	989868	988707	1011292	22	021423	010131
851	39	978592	989859	988733	1011266	21	021407	010140
860	40	978608	989849	988759	1011240	20	021391	010150
870	41	978625	989839	988785	1011214	19	021374	010160
879	42	978641	989829	988811	1011188	18	021358	010170
889	43	978657	989820	988837	1011162	17	021342	010179
898	44	978674	989810	988863	1011136	16	021325	010189
903	45	978690	989800	988889	1011110	15	021309	010199
918	46	978706	989790	988916	1011083	14	021293	010209
927	47	978723	989781	988942	1011057	13	021276	010218
937	48	978739	989771	988968	1011031	12	021260	010228
947	49	978755	989761	988994	1011005	11	021244	010238
956	50	978772	989751	989020	1010979	10	021227	010248
966	51	978788	989741	989046	1010953	9	021211	010258
975	52	978804	989731	989072	1010927	8	021195	010268
985	53	978820	989722	989098	1010901	7	021179	010277
995	54	978837	989712	989124	1010875	6	021162	010287
004	55	978853	989702	989150	1010849	5	021146	010297
014	56	978869	989692	989176	1010823	4	021130	010307
024	57	978885	989682	989202	1010797	3	021114	010317
033	58	978901	989672	989228	1010771	2	021098	010327
043	59	978918	989663	989254	1010745	1	021081	010336
053	60	978934	989653	989280	1010719	0	021065	010346
		Sine comple.	Sine.	Tangent comple.	Tang.	52		

38	Sine.	Sine Comple.	Tang.	Tangent Complem.	Comp. ar. of Sine.	Comp. ar. of Si.co.
1	978934	989653	989280	101071960	021065	010346
2	978950	989643	989307	1010692	59 021049	010356
3	978966	989633	989333	1010666	58 021033	010366
4	978982	989623	989359	1010640	57 021017	010376
5	978998	989613	989385	1010614	56 021001	010386
6	979014	989603	989411	1010588	55 020985	010396
7	979031	989593	989437	1010562	54 020968	010406
8	979047	989583	989463	1010536	53 020952	010416
9	979063	989574	989489	1010510	52 020936	010425
10	979079	989564	989515	1010484	51 020920	010435
11	979095	989554	989541	1010458	50 020904	010445
12	979111	989544	989567	1010432	49 020888	010455
13	979127	989534	989593	1010406	48 020872	010465
14	979143	989524	989619	1010380	47 020856	010475
15	979159	989514	989645	1010354	46 020840	010485
16	979175	989504	989671	1010328	45 020824	010495
17	979191	989494	989697	1010302	44 020808	010505
18	979207	989484	989723	1010276	43 020792	010515
19	979223	989474	989749	1010250	42 020776	010525
20	979239	989464	989775	1010224	41 020760	010535
21	979255	989454	989801	1010198	40 020744	010545
22	979271	989444	989827	1010172	39 020728	010555
23	979287	989434	989852	1010147	38 020712	010565
24	979303	989424	989878	1010121	37 020696	010575
25	979319	989414	989904	1010095	36 020680	010585
26	979335	989404	989930	1010069	35 020664	010595
27	979351	989394	989956	1010043	34 020648	010605
28	979367	989384	989982	1010017	33 020632	010615
29	979383	989374	990008	1009991	32 020616	010625
30	979399	989364	990034	1009965	31 020600	010635
31	979417	989354	990060	1009939	30 020585	010645
	Sine Comple.	Sine.	Tangent Complem.	Tang.	51	

	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of S. co.
346	979414	989354	990060	1009939	30020585	010645
356	979430	989344	990086	1009913	29020569	010655
366	979446	989334	990112	1009887	28020553	010665
376	979462	989324	990138	1009861	27020537	010675
386	979478	989314	990164	1009835	26020521	010685
396	979494	989304	990190	1009809	25020505	010695
406	979510	989294	990216	1009783	24020489	010705
416	979525	989283	990241	1009758	23020474	010716
425	979541	989273	990267	1009732	22020458	010726
435	979557	989263	990293	1009706	21020442	010736
445	979573	989253	990319	1009680	20020426	010746
455	979589	989243	990345	1009654	19020410	010756
465	979604	989233	990371	1009628	18020395	010766
475	979620	989223	990397	1009602	17020379	010776
485	979636	989213	990423	1009576	16020363	010786
495	979652	989203	990449	1009550	15020347	010796
505	979667	989192	990474	1009525	14020332	010807
515	979683	989182	990500	1009499	13020316	010817
525	979699	989172	990526	1009473	12020300	010827
535	979715	989162	990552	1009447	11020284	010837
545	979730	989152	990578	1009421	10020269	010847
555	979746	989142	990604	1009395	9020253	010857
565	979762	989131	990630	1009369	8020237	010868
575	979777	989121	990656	1009343	7020222	010878
585	979793	989111	990681	1009318	6020206	010888
595	979809	989101	990707	1009292	5020190	010898
605	979824	989091	990733	1009266	4020175	010908
615	979840	989080	990759	1009240	3020159	010919
625	979855	989070	990785	1009214	2020144	010929
635	979871	989060	990811	1009188	1020128	010939
645	979887	989050	990836	1009163	0020112	010949
	Sine comple.	Sine.	Tangent comple.	Tang.	51	

39	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of line.	com. ar. of sin.
0	979887	989050	990836	1009163	60	020112
1	979902	989040	990862	1009137	59	020097
2	979928	989029	990888	1009111	58	020081
3	979953	989019	990914	1009085	57	020066
4	979979	989009	990940	1009059	56	020050
5	979965	988999	990966	1009033	55	020034
6	979980	988988	990991	1009008	54	020019
7	979996	988978	991017	1008982	53	020003
8	980011	988968	991043	1008956	52	019988
9	980027	988957	991069	1008930	51	019972
10	980042	988947	991095	1008904	50	019957
11	980058	988937	991120	1008879	49	019941
12	980073	988927	991146	1008853	48	019926
13	980089	988916	991172	1008827	47	019910
14	980104	988906	991198	1008801	46	019895
15	980120	988896	991224	1008775	45	019879
16	980135	988885	991249	1008750	44	019864
17	980151	988875	991275	1008724	43	019848
18	980166	988865	991301	1008698	42	019833
19	980181	988854	991327	1008672	41	019818
20	980197	988844	991352	1008647	40	019803
21	980212	988834	991378	1008621	39	019787
22	980228	988823	991404	1008595	38	019771
23	980243	988813	991430	1008569	37	019756
24	980258	988802	991455	1008544	36	019741
25	980274	988792	991482	1008518	35	019725
26	980289	988782	991507	1008492	34	019710
27	980305	988771	991533	1008466	33	019694
28	980320	988761	991558	1008441	32	019679
29	980335	988751	991584	1008415	31	019664
30	980351	988740	991610	1008389	30	019648
	Sine Comple.	Sine.	Tangent Complem.	Tang.	50	

	39	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si.co.	
094	30	980351	998740	991610	1008389	30	019648	011259
095	31	980366	988730	991636	1008363	29	019633	011269
097	32	980381	988719	991661	1008338	28	019618	011280
098	33	980396	988709	991687	1008312	27	019603	011290
099	34	980412	988698	991713	1008286	26	019587	011301
100	35	980427	988688	991739	1008260	25	019572	011311
101	36	980442	988678	991764	1008235	24	019557	011321
102	37	980458	988667	991790	1008209	23	019541	011332
103	38	980473	988657	991816	1008183	22	019526	011342
104	39	980488	988646	991841	1008158	21	019511	011353
105	40	980503	988636	991867	1008132	20	019496	011363
106	41	980519	988625	991893	1008106	19	019480	011374
107	42	980534	988615	991919	1008080	18	019465	011384
108	43	980549	988604	991944	1008055	17	019450	011395
109	44	980564	988594	991970	1008029	16	019435	011405
110	45	980579	988583	991996	1008003	15	019420	011416
111	46	980595	988573	992021	1007978	14	019404	011426
112	47	980610	988562	992047	1007952	13	019389	011437
113	48	980625	988552	992073	1007926	12	019374	011447
114	49	980640	988541	992098	1007901	11	019359	011458
115	50	980655	988531	992124	1007875	10	019344	011468
116	51	980670	988520	992150	1007849	9	019329	011479
117	52	980686	988510	992176	1007823	8	019313	011490
118	53	980701	988499	992201	1007798	7	019298	011500
119	54	980716	988488	992227	1007772	6	019283	011511
120	55	980731	988478	992253	1007746	5	019268	011521
121	56	980746	988467	992278	1007721	4	019253	011532
122	57	980761	988457	992304	1007695	3	019238	011542
123	58	980776	988446	992330	1007669	2	019223	011553
124	59	980791	988435	992355	1007644	1	019208	011564
125	60	980806	988425	992381	1007618	0	019193	011574

Sine Comple.	Sine.	Tangent Comple.	Tang.	50
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40	Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar. of sine	com. ar. of f. ca.
0	980806	988425	992381	1007618	60	019193
1	980821	988414	992407	1007592	59	019178
2	980836	988404	992432	1007567	58	019163
3	980851	988393	992458	1007541	57	019141
4	980866	988382	992483	1007516	56	019133
5	980881	988372	992509	1007490	55	019118
6	980896	988361	992535	1007464	54	019103
7	980911	988351	992560	1007439	53	019088
8	980926	988340	992586	1007413	52	019073
9	980941	988329	992612	1007387	51	019058
10	980956	988319	992637	1007362	50	019043
11	980971	988308	992663	1007336	49	019028
12	980986	988297	992689	1007310	48	019013
13	981001	988287	992714	1007285	47	018998
14	981016	988276	992740	1007259	46	018983
15	981031	988265	992765	1007234	45	018968
16	981046	988254	992791	1007208	44	018953
17	981061	988244	992817	1007182	43	018938
18	981076	988233	992842	1007157	42	018923
19	981091	988222	992868	1007131	41	018908
20	981106	988212	992893	1007106	40	018893
21	981120	988201	992919	1007080	39	018879
22	981135	988190	992945	1007054	38	018864
23	981150	988179	992970	1007029	37	018849
24	981165	988169	992996	1007003	36	018834
25	981180	988158	993021	1006978	35	018819
26	981195	988147	993047	1006952	34	018804
27	981210	988136	993073	1006926	33	018789
28	981224	988126	993098	1006901	32	018775
29	981239	988115	993124	1006875	31	018760
30	981254	988104	993149	1006850	30	018745
	Sine Comple.	Sine.	Tangent Comple.	Tang.	49	

	40	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si.co.	
157	30	981254	998104	993149	1006850	30	018745	011895
158	31	981269	988093	993175	1006824	29	018730	011906
159	32	981284	988082	993201	1006798	28	018715	011917
160	33	981298	988072	993226	1006773	27	018701	011927
161	34	981313	988061	993252	1006747	26	018686	011938
162	35	981328	988050	993277	1006722	25	018671	011949
163	36	981343	988039	993303	1006696	24	018656	011960
164	37	981357	988028	993328	1006671	23	018642	011971
165	38	981372	988018	993354	1006645	22	018627	011981
166	39	981387	988007	993380	1006619	21	018612	011992
168	40	981401	987996	993405	1006594	20	018598	012003
169	41	981416	987985	993431	1006568	19	018583	012014
170	42	981431	987974	993456	1006543	18	018568	012025
171	43	981446	987963	993482	1006517	17	018554	012036
172	44	981460	987952	993507	1006492	16	018539	012047
173	45	981475	987941	993533	1006466	15	018524	012058
174	46	981489	987931	993558	1006441	14	018510	012068
175	47	981504	987920	993584	1006415	13	018495	012079
176	48	981519	987909	993609	1006390	12	018480	012090
177	49	981533	987898	993635	1006364	11	018466	012101
178	50	981548	987887	993661	1006338	10	018451	012112
179	51	981563	987876	993686	1006313	9	018436	012123
180	52	981577	987865	993712	1006287	8	018421	012134
181	53	981592	987854	993737	1006262	7	018407	012145
183	54	981606	987843	993763	1006236	6	018393	012156
184	55	981621	987832	993788	1006211	5	018378	012167
185	56	981636	987821	993814	1006185	4	018363	012178
186	57	981650	987810	993839	1006160	3	018349	012189
187	58	981665	987799	993865	1006134	2	018334	012200
188	59	981679	987788	993890	1006109	1	018320	012211
189	60	981694	987777	993916	1006083	0	018305	012222

Sine Comple.	Sine.	Tangent Comple.	Tang.	49
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41	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of sine	Com. ar. of Si. co
0	981694	987777	993916	1006083	60	018303
1	981708	987767	993941	1006058	59	018291
2	981723	987756	993967	1006032	58	018276
3	981737	987745	993992	1006007	57	018262
4	981752	987734	994018	1005981	56	018247
5	981766	987723	994043	1005956	55	018233
6	981781	987711	994069	1005930	54	018218
7	981795	987700	994094	1005905	53	018204
8	981810	987689	994120	1005879	52	018189
9	981824	987678	994145	1005854	51	018175
10	981839	987667	994171	1005828	50	018160
11	981853	987656	994196	1005803	49	018146
12	981868	987645	994222	1005777	48	018131
13	981882	987634	994247	1005752	47	018117
14	981896	987623	994273	1005726	46	018103
15	981911	987612	994298	1005701	45	018088
16	981925	987601	994324	1005675	44	018074
17	981940	987590	994349	1005650	43	018059
18	981954	987579	994375	1005624	42	018045
19	981968	987568	994400	1005599	41	018031
20	981983	987557	994426	1005573	40	018016
21	981997	987545	994451	1005548	39	018002
22	982011	987534	994477	1005522	38	017988
23	982026	987523	994502	1005497	37	017973
24	982040	987512	994528	1005471	36	017959
25	982054	987501	994553	1005446	35	017945
26	982069	987490	994579	1005421	34	017930
27	982083	987479	994604	1005395	33	017916
28	982097	987467	994629	1005370	32	017902
29	982112	987456	994655	1005344	31	017887
30	982126	987445	994680	1005319	30	017873

Sine comple.	Sine	Tangent comple.	Tang. 148
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	Sine.	Sine Comple.	Tang.	Tangent Comple.		Com. ar. of Sine.	Com. ar. of Si.co.
1	982126	987445	994680	1005319	30	017873	012554
2	982140	987434	994706	1005293	29	017859	012565
3	982155	987423	994731	1005268	28	017845	012576
4	982169	987412	994757	1005242	27	017830	012587
5	982183	987400	994782	1005217	26	017816	012599
6	982197	987389	994808	1005191	25	017802	012610
7	982211	987378	994833	1005166	24	017788	012621
8	982226	987367	994858	1005141	23	017773	012632
9	982240	987355	994884	1005115	22	017759	012644
10	982254	987344	994909	1005090	21	017745	012655
11	982268	987333	994935	1005064	20	017731	012666
12	982283	987322	994960	1005039	19	017716	012677
13	982297	987311	994986	1005013	18	017702	012688
14	982311	987299	995011	1004988	17	017688	012700
15	982325	987288	995037	1004962	16	017674	012711
16	982339	987277	995062	1004937	15	017660	012722
17	982353	987265	995087	1004912	14	017646	012734
18	982368	987254	995113	1004886	13	017632	012745
19	982382	987243	995138	1004861	12	017617	012756
20	982396	987232	995164	1004835	11	017603	012767
21	982410	987220	995189	1004810	10	017589	012779
22	982424	987209	995215	1004784	9	017575	012790
23	982438	987198	995240	1004759	8	017561	012801
24	982452	987186	995265	1004734	7	017547	012813
25	982466	987175	995291	1004708	6	017533	012824
26	982480	987164	995316	1004683	5	017519	012835
27	982494	987152	995342	1004657	4	017505	012847
28	982508	987141	995367	1004632	3	017491	012858
29	982523	987130	995392	1004607	2	017476	012869
30	982537	987118	995418	1004581	1	017462	012881
31	982551	987107	995443	1004556	0	017448	012892

Sine Comple.	Sine.	Tangent Comple.	Tang.	48
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42	Sine.	Sine Compl.	Tang.	Tangent Complem.	Com. ar. of sine	Com. ar. of Si. co.
0	982551	987107	995443	1004556	60	017448
1	982565	987095	995469	1004530	59	017434
2	982579	987084	995494	1004505	58	017420
3	982593	987073	995519	1004480	57	017406
4	982607	987061	995545	1004454	56	017392
5	982621	987050	995570	1004429	55	017378
6	982635	987038	995596	1004403	54	017364
7	982649	987027	995621	1004378	53	017350
8	982663	987016	995646	1004353	52	017336
9	982677	987004	995672	1004327	51	017322
10	982690	986993	995697	1004302	50	017309
11	982704	986981	995723	1004276	49	017295
12	982718	986970	995748	1004251	48	017281
13	982732	986958	995773	1004226	47	017267
14	982746	986947	995799	1004200	46	017253
15	982760	986935	995824	1004175	45	017239
16	982774	986924	995850	1004149	44	017225
17	982788	986913	995875	1004124	43	017211
18	982802	986901	995900	1004099	42	017197
19	982816	986890	995926	1004073	41	017182
20	982830	986878	995951	1004048	40	017169
21	982843	986867	995976	1004023	39	017155
22	982857	986855	996002	1003997	38	017142
23	982871	986843	996027	1003972	37	017128
24	982885	986832	996053	1003946	36	017114
25	982899	986820	996078	1003921	35	017100
26	982913	986809	996103	1003896	34	017086
27	982926	986797	996129	1003870	33	017073
28	982940	986786	996154	1003845	32	017059
29	982954	986774	996179	1003820	31	017045
30	982968	986763	996205	1003794	30	017031

Sine comple.	Sine	Tangent comple.	Tang. 47
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	42	Sine.	Sine Comple.	Tang.	Tangent Complem.	Com. ar. of Sine.	Com. ar. of Si. co.
1891	30	982968	986763	996205	1003794	10017031	013236
1904	31	982982	986751	996230	1003769	29 017017	013248
1919	32	982995	986739	996255	1003744	28 017004	013260
1926	33	983009	986728	996281	1003718	27 016990	013271
1938	34	983023	986716	996306	1003693	26 016976	013283
1949	35	983037	986705	996332	1003667	25 016962	013294
1961	36	983050	986693	996357	1003642	24 016949	013306
1972	37	983064	986681	996382	1003617	23 016935	013318
1983	38	983078	986670	996408	1003591	22 016921	013329
1995	39	983092	986658	996433	1003566	21 016907	013341
2006	40	983105	986646	996458	1003541	20 016894	013353
2018	41	983119	986635	996484	1003515	19 016880	013364
2029	42	983133	986623	996509	1003490	18 016866	013376
2041	43	983146	986612	996534	1003465	17 016853	013387
2052	44	983160	986600	996560	1003439	16 016839	013399
2064	45	983174	986588	996585	1003414	15 016825	013411
2075	46	983187	986577	996610	1003389	14 016812	013423
2086	47	983201	986565	996636	1003363	13 016798	013434
2098	48	983215	986553	996661	1003338	12 016784	013446
2109	49	983228	986541	996686	1003313	11 016771	013458
2121	50	983242	986530	996712	1003287	10 016757	013469
2133	51	983256	986518	996737	1003262	9 016743	013481
2144	52	983269	986506	996762	1003237	8 016730	013493
2156	53	983283	986495	996788	1003211	7 016716	013504
2167	54	983296	986483	996813	1003186	6 016703	013516
2179	55	983310	986471	996838	1003161	5 016689	013528
2190	56	983324	986459	996864	1003135	4 016675	013540
2202	57	983337	986448	996889	1003110	3 016662	013551
2213	58	983351	986436	996914	1003085	2 016648	013563
2225	59	983364	986424	996940	1003059	1 016635	013575
2236	60	983378	986412	996965	1003034	0 016621	013587
		Sine comple.	Sine.	Tangent comple.	Tang.	47	

43	Sine.	Sine Comple.	Tang.	Tangent Comple.	com. ar.	com. ar.
					of sine	of fi. co.

0	983278	986412	996965	1003034	60	016687	013599
1	983391	986400	996990	1003009	59	016608	013599
2	983405	986389	997016	1002933	58	016594	003610
3	983418	986377	997041	1002958	57	016581	013620
4	983432	986365	997066	1002933	56	016567	013634
5	983445	986353	997092	1002907	55	016554	013646
6	983459	986341	997117	1002882	54	016540	013658
7	983472	986330	997142	1002857	53	016527	013669
8	983486	986318	997168	1002831	52	016513	013681
9	983499	986306	997193	1002806	51	016500	013693
10	983513	986296	997218	1002781	50	016486	013705
11	983526	986282	997244	1002755	49	016473	013717
12	983540	986270	997269	1002730	48	016459	013729
13	983553	986259	997294	1002705	47	016446	013740
14	983567	986247	997320	1002679	46	016433	013752
15	983580	986235	997345	1002654	45	016419	013764
16	983594	986223	997370	1002629	44	016405	013776
17	983607	986211	997396	1002603	43	016392	013788
18	983620	986199	997421	1002578	42	016379	013800
19	983634	986187	997446	1002553	41	016365	013812
20	983647	986175	997471	1002528	40	016352	013824
21	983661	986163	997497	1002502	39	016338	013836
22	983674	986151	997522	1002477	38	016325	013848
23	983687	986139	997547	1002452	37	016312	013860
24	983701	986128	997573	1002426	36	016298	013871
25	983714	986116	997598	1002401	35	016285	013883
26	983727	986104	997623	1002376	34	016272	013895
27	983741	986092	997649	1002350	33	016258	013907
28	983754	986080	997674	1002325	32	016245	013919
29	983767	986068	997699	1002300	31	016232	013931
30	983781	986056	997725	1002275	30	016218	013943

Sine Comple.	Sine.	Tangent Comple.	Tang.
			46

43	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of Sine.	com. ar. of ff. co.
30	983781	986056	997725	1002275	30	016218
31	983794	986044	997750	1002249	29	016205
32	983807	986032	997775	1002224	28	016192
33	983821	986020	997800	1002199	27	016178
34	983834	986008	997826	1002173	26	016165
35	983847	985996	997851	1002148	25	016152
36	983860	985984	997876	1002123	24	016139
37	983874	985972	997902	1002097	23	016125
38	983887	985960	997927	1002072	22	016112
39	983900	985948	997952	1002047	21	016099
40	983913	985935	997977	1002022	20	016086
41	983927	985923	998000	1001996	19	016072
42	983940	985911	998028	1001971	18	016059
43	983953	985899	998053	1001946	17	016046
44	983966	985887	998079	1001920	16	016033
45	983980	985875	998104	1001895	15	016019
46	983993	985863	998129	1001870	14	016006
47	983006	985851	998155	1001844	13	015993
48	983019	985839	998180	1001819	12	015980
49	983032	985827	998205	1001794	11	015967
50	983045	985815	998230	1001769	10	015954
51	983059	985802	998256	1001743	9	015940
52	983072	985790	998281	1001718	8	015927
53	983085	985778	998306	1001693	7	015914
54	983098	985768	998332	1001667	6	015901
55	983111	985754	998357	1001642	5	015888
56	983124	985742	998382	1001617	4	015875
57	983137	985729	998407	1001592	3	015862
58	983150	985717	998433	1001566	2	015849
59	983164	985705	998458	1001541	1	015835
60	983177	985693	998483	1001516	0	015822

Sine  
comple. | Sine. | Tangent  
comple. | Tang. | 46

44	Sine.	Sine comple.	Tang.	Tangent comple.	com. ar. of sine.	com. ar. of fin. co.
0	984177	985693	998483	10015166	015822	014306
1	984190	985681	998509	10014915	015809	014318
2	984203	985669	998534	10014655	015796	014331
3	984216	985656	998559	10014405	015783	014343
4	984229	985644	998584	10014155	015770	014355
5	984242	985632	998610	10013895	015757	014367
6	984255	985620	998635	10013645	015744	014379
7	984268	985607	998660	10013395	015731	014392
8	984281	985595	998685	10013145	015718	014404
9	984294	985583	998711	10012885	015705	014416
10	984307	985571	998736	10012635	015692	014428
11	984320	985558	998761	10012384	015679	014441
12	984333	985546	998787	10012124	015666	014453
13	984346	985534	998812	10011874	015653	014465
14	984359	985521	998837	10011624	015640	014478
15	984372	985509	998862	10011374	015627	014490
16	984385	985497	998888	10011114	015614	014502
17	984398	985484	998913	10010864	015601	014515
18	984411	985472	998938	10010614	015588	014527
19	984424	985460	998963	10010364	015575	014539
20	984437	985447	998989	10010104	015562	014552
21	984450	985435	999014	10009854	015549	014564
22	984463	985423	999039	10009604	015536	014576
23	984476	985410	999065	10009354	015523	014589
24	984488	985398	999090	10009094	015511	014601
25	984501	985386	999115	10008844	015498	014613
26	984514	985373	999140	10008594	015485	014626
27	984527	985361	999166	10008334	015472	014638
28	984540	985349	999191	10008084	015459	014650
29	984553	985336	999216	10007834	015446	014663
30	984566	985324	999241	10007584	015433	014675
	Sine Comple.	Sine.	Tangent Complem.	Tang.	45	

44	Sine.	Sine Comple.	Tang.	Tangent Comple.	Com. ar. of Sine.	Com. ar. of Si.co.	
30	984566	985324	999241	1000758	30	015433	014675
31	984579	985311	999267	1000732	29	015420	014688
32	984591	985299	999292	1000707	28	015408	014700
33	984604	985286	999317	1000682	27	015395	014713
34	984617	985274	999343	1000656	26	015382	014725
35	984630	985262	999368	1000631	25	015369	014737
36	984643	985249	999393	1000606	24	015356	014750
37	984655	985237	999418	1000581	23	015344	014762
38	984668	985224	999444	1000555	22	015331	014775
39	984681	985212	999469	1000530	21	015318	014787
40	984694	985199	999494	1000505	20	015305	014800
41	984707	985187	999519	1000480	19	015292	014812
42	984719	985174	999545	1000454	18	015280	014825
43	984732	985162	999570	1000429	17	015267	014837
44	984745	985149	999595	1000404	16	015254	014850
45	984758	985137	999621	1000379	15	015241	014862
46	984770	985124	999646	1000353	14	015229	014875
47	984783	985112	999671	1000328	13	015216	014887
48	984796	985099	999696	1000303	12	015203	014900
49	984809	985087	999722	1000277	11	015190	014912
50	984821	985074	999747	1000252	10	015178	014925
51	984834	985061	999772	1000227	9	015165	014938
52	984847	985049	999797	1000202	8	015152	014950
53	984859	985036	999823	1000176	7	015140	014963
54	984872	985024	999848	1000151	6	015127	014975
55	984885	985011	999873	1000126	5	015114	014988
56	984897	984998	999898	1000101	4	015102	015001
57	984910	984986	999924	1000075	3	015089	015013
58	984923	984973	999949	1000050	2	015076	015026
59	984935	984961	999974	1000025	1	015064	015038
60	984948	984948	1000000	1000000	0	015051	015051

Sine Comple.	Sine.	Tangent Comple.	Tang.	45
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*How to examine the Truth of the foregoing Canon of Sines and Tangents.*

**T**O the sine of any degree and minute add its Complement Arithmetical, and the sum of them shall be 999999, or rather 1000000. Also, If to the tangent of any degree and minute you add its Complement, the Summe shall be 1999999, or rather 2000000, but a Unites difference in the last place is not at all material. Thus if you doubt of the truth of any number in the Canon, you may by this rule easily discover it, or if any Figure do not appear, this rule will tell you what Figure it should be.

A

**CHILIAD,**

OR THE

**LOGARITHMS**

O F

**Absolute Numbers, from an  
Unite to 1000.**

# Chifias 1.

Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.
1	000000	34	153147	67	182607	100	200000
2	030103	35	154406	68	183250	101	200432
3	047712	36	155630	69	183884	102	200860
4	060206	37	156820	70	184509	103	201283
5	069897	38	157978	71	185125	104	201703
6	077815	39	159106	72	185733	105	202118
7	084509	40	160206	73	186332	106	202530
8	090309	41	161278	74	186923	107	202938
9	095424	42	162324	75	187506	108	203342
10	100000	43	163346	76	188081	109	203742
11	104139	44	164345	77	188649	110	204139
12	107918	45	145321	78	189209	111	204532
13	111394	46	166275	79	189762	112	204921
14	114612	47	167209	80	190309	113	205307
15	117609	48	168124	81	190848	114	205690
16	120412	49	169019	82	191381	115	206069
17	123044	50	169897	83	191907	116	206445
18	125527	51	170757	84	192427	117	206818
19	127875	52	171600	85	192941	118	207188
20	130103	53	172427	86	193449	119	207554
21	132221	54	173239	87	193951	120	207918
22	134242	55	174036	88	194448	121	208278
23	136172	56	174818	89	194939	122	208635
24	138021	57	175587	90	195424	123	208990
25	139794	58	176342	91	195904	124	209342
26	141497	59	177055	92	196378	125	209691
27	143136	60	177815	93	196848	126	210037
28	144715	61	178532	94	197312	127	210380
29	146239	62	179239	95	197772	128	210720
30	147712	63	179934	96	198227	129	211058
31	149136	64	180618	97	198677	130	211394
32	150515	65	181291	98	199122	131	211727
33	151851	66	181954	99	199563	132	212057

# Chilias I.

Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.
133	212385	166	222010	199	229885	232	236548
134	212710	167	222271	200	230103	233	236735
135	213033	168	222530	201	230319	234	236921
136	213353	169	222788	202	230535	235	237106
137	213672	170	223044	203	230749	236	237291
138	213987	171	223299	204	230963	237	237474
139	214301	172	223552	205	231175	238	237657
140	214612	173	223804	206	231386	239	237839
141	214921	174	224054	207	231597	240	238021
142	215228	175	224303	208	231806	241	238201
143	215533	176	224551	209	232014	242	238381
144	215836	177	224799	210	232221	243	238560
145	216136	178	225042	211	232428	244	238738
146	216435	179	225285	212	232633	245	238916
147	216731	180	225527	213	232837	246	239093
148	217026	181	225767	214	233041	247	239269
149	217318	182	226007	215	233243	248	239445
150	217609	183	226245	216	233445	249	239619
151	217897	184	226481	217	233645	250	239794
152	218184	185	226717	218	233845	251	239967
153	218469	186	226951	219	234044	252	240140
154	218752	187	227184	220	234242	253	240312
155	219033	188	227415	221	234439	254	240483
156	219312	189	227646	222	234635	255	240654
157	219589	190	227875	223	234830	256	240824
158	219865	191	228103	224	235024	257	240993
159	220139	192	228330	225	235218	258	241161
160	220412	193	228555	226	235410	259	241329
161	220682	194	228780	227	235602	260	241497
162	220951	195	229003	228	235793	261	241664
163	221218	196	229225	229	235983	262	241830
164	221484	197	229446	230	236172	263	241995
165	221748	198	229666	231	236361	264	242160

# Chilias I.

Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.
265	242324	298	247421	331	251982	364	256110
266	242488	299	247565	332	252113	365	256229
267	242651	300	247712	333	252244	366	256348
268	242813	301	247856	334	252374	367	256466
269	242975	302	248000	335	252504	368	256584
270	243136	303	248144	336	252633	369	256702
271	243296	304	248287	337	252762	370	256820
272	243456	305	248429	338	252891	371	256937
273	243616	306	248572	339	253019	372	257054
274	243775	307	248713	340	253147	373	257170
275	243933	308	248855	341	253275	374	257287
276	244090	309	248995	342	253402	375	257403
277	244247	310	249136	343	253529	376	257518
278	244404	311	249276	344	253655	377	257634
279	244560	312	249415	345	253781	378	257749
280	244715	313	249554	346	253907	379	257863
281	244870	314	249692	347	254032	380	257978
282	245024	315	249831	348	254157	381	258092
283	245178	316	249968	349	254282	382	258206
284	245331	317	250105	350	254406	383	258319
285	245484	318	250242	351	254530	384	258433
286	245636	319	250379	352	254654	385	258546
287	245788	320	250515	353	254777	386	258658
288	245939	321	250650	354	254900	387	258771
289	246089	322	250785	355	255022	388	258883
290	246239	323	250920	356	255145	389	258994
291	246389	324	251054	357	255266	390	259106
292	246538	325	251188	358	255388	391	259217
293	246686	326	251321	359	255509	392	259328
294	246834	327	251454	360	255630	393	259439
295	246982	328	251587	361	255750	394	259549
296	247129	329	251719	362	255870	395	259659
297	247275	330	251851	363	255990	396	259769

# Chilias I.

Nū.	Logar.	Nū.	Logar.	Nū.	Logar.	Nū.	Logar.
397	259879	430	263346	463	266558	496	269548
398	259988	431	263447	464	266651	497	269639
399	260097	432	263548	465	266745	498	269728
400	260206	433	263648	466	266838	499	269816
401	260314	434	263748	467	266931	500	269907
402	260422	435	263848	468	267024	501	269998
403	260530	436	263948	469	267117	502	270089
404	260638	437	264048	470	267209	503	270180
405	260745	438	264147	471	267302	504	270271
406	260852	439	264246	472	267394	505	270362
407	260959	440	264345	473	267486	506	270453
408	261066	441	264443	474	267577	507	270544
409	261172	442	264542	475	267669	508	270635
410	261278	443	264640	476	267760	509	270726
411	261384	444	264738	477	267851	510	270817
412	261489	445	264836	478	267942	511	270908
413	261595	446	264933	479	268033	512	271000
414	261700	447	265030	480	268124	513	271091
415	261804	448	265127	481	268214	514	271182
416	261809	449	265224	482	268304	515	271273
417	262013	450	265321	483	268394	516	271364
418	262117	451	265417	484	268484	517	271455
419	262221	452	265513	485	268574	518	271546
420	262324	453	265609	486	268663	519	271637
421	262427	454	265705	487	268752	520	271728
422	262531	455	265801	488	268841	521	271819
423	262634	456	265896	489	268930	522	271910
424	262736	457	265991	490	269019	523	272001
425	262838	458	266086	491	269108	524	272092
426	262940	459	266181	492	269196	525	272183
427	263042	460	266275	493	269284	526	272274
428	263144	461	266370	494	269372	527	272365
429	263245	462	266464	495	269460	528	272456

# Chilias r.

Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.
529	272345	562	274973	595	277451	628	279765
530	272427	563	275050	596	277524	629	279865
531	272509	564	275127	597	277597	630	279934
532	272591	565	275204	598	277670	631	280002
533	272672	566	275281	599	277742	632	280071
534	272754	567	275358	600	277815	633	280140
535	272835	568	275434	601	277887	634	280208
536	272916	569	275511	602	277959	635	280277
537	272997	570	275587	603	278031	636	280345
538	273078	571	275663	604	278103	637	280413
539	273158	572	275739	605	278175	638	280482
540	273239	573	275815	606	278247	639	280550
541	273319	574	275891	607	278318	640	280618
542	273399	575	275966	608	278390	641	280685
543	273479	576	276042	609	278461	642	280753
544	273559	577	276117	610	278532	643	280821
545	273639	578	276192	611	278604	644	280888
546	273719	579	276267	612	278675	645	280955
547	273798	580	276342	613	278746	646	281023
548	273878	581	276417	614	278816	647	281090
549	273957	582	276492	615	278887	648	281157
550	274036	583	276566	616	278958	649	281224
551	274115	584	276641	617	279028	650	281291
552	274193	585	276715	618	279098	651	281358
553	274272	586	276789	619	279169	652	281424
554	274350	587	276863	620	279239	653	281491
555	274429	588	276937	621	279309	654	281557
556	274507	589	277011	622	279379	655	281624
557	274585	590	277085	623	279448	656	281690
558	274663	591	277158	624	279518	657	281756
559	274741	592	277232	625	279588	658	281832
560	274818	593	277305	626	279657	659	281888
561	274896	594	277378	627	279736	660	281954

# Chilias I.

Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.
661	282020	694	284135	727	286153	760	288081
662	282085	695	284198	728	286213	761	288138
663	282151	696	284260	729	286272	762	288195
664	282216	697	284323	730	286332	763	288252
665	282282	698	284385	731	286391	764	288309
666	282347	699	284447	732	286451	765	288366
667	282412	700	284509	733	286510	766	288422
668	282477	701	284571	734	286569	767	288479
669	282542	702	284633	735	286628	768	288536
670	282607	703	284695	736	286687	769	288592
671	282672	704	284757	737	286746	770	288649
672	282736	705	284818	738	286805	771	288705
673	282801	706	284880	739	286864	772	288761
674	282865	707	284941	740	286923	773	288817
675	282930	708	285003	741	286981	774	288874
676	282994	709	285064	742	287040	775	288930
677	283058	710	285125	743	287098	776	288986
678	283122	711	285186	744	287157	777	289042
679	283186	712	285248	745	287215	778	289097
680	283250	713	285308	746	287273	779	289153
681	283314	714	285369	747	287332	780	289209
682	283378	715	285430	748	287390	781	289265
683	283442	716	285491	749	287448	782	289320
684	283505	717	285551	750	287506	783	289376
685	283569	718	285612	751	287565	784	289431
686	283632	719	285672	752	287621	785	289486
687	283695	720	285733	753	287679	786	289542
688	283758	721	285793	754	287737	787	289597
689	283821	722	285853	755	287795	788	289652
690	283884	723	285913	756	287852	789	289707
691	283947	724	285973	757	287909	790	289762
692	284010	725	286033	758	287966	791	289817
693	284073	726	286093	759	288024	792	289872

# Chilias I.

Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.
793	289927	826	291698	859	293399	892	295036
794	289982	827	291750	860	293449	893	295085
795	290036	828	291803	861	293500	894	295133
796	290091	829	291855	862	293550	895	295182
797	290145	830	291907	863	293601	896	295230
798	290200	831	291960	864	293651	897	295279
799	290254	832	292012	865	293701	898	295327
800	290309	833	292064	866	293751	899	295375
801	290363	834	292116	867	293801	900	295424
802	290417	835	292168	868	293851	901	295472
803	290471	836	292220	869	293901	902	295520
804	290525	837	292272	870	293951	903	295568
805	290579	838	292324	871	294001	904	295616
806	290633	839	292376	872	294051	905	295664
807	290687	840	292427	873	294101	906	295712
808	290741	841	292479	874	294151	907	295760
809	290794	842	292531	875	294200	908	295808
810	290848	843	292582	876	294250	909	295856
811	290902	844	292634	877	294299	910	295904
812	290955	845	292685	878	294349	911	295951
813	291009	846	292737	879	294398	912	295999
814	291062	847	292788	880	294448	913	296047
815	291115	848	292839	881	294497	914	296094
816	291169	849	292890	882	294546	915	296142
817	291222	850	292941	883	294596	916	296189
818	291275	851	292992	884	294645	917	296236
819	291328	852	293043	885	294694	918	296284
820	291381	853	293094	886	294743	919	296331
821	291434	854	293145	887	294792	920	296378
822	291487	855	293196	888	294841	921	296425
823	291539	856	293247	889	294890	922	296473
824	291592	857	293298	890	294939	923	296520
825	291645	858	293348	891	294987	924	296567

# Chilias 1.

Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.	Nũ.	Logar.
925	296614	944	297497	963	298362	982	299211
926	296661	945	297543	964	298407	983	299255
927	296707	946	297589	965	298452	984	299299
928	296754	947	297635	966	298497	985	299343
929	296801	948	297680	967	298542	986	299387
930	296848	949	297726	968	298587	987	299431
931	296894	950	297772	969	298632	988	299475
932	296941	951	297818	970	298677	989	299519
933	296988	952	297863	971	298721	990	299563
934	297034	953	297909	972	298766	991	299607
935	297081	954	297954	973	298811	992	299651
936	297127	955	298000	974	298855	993	299695
937	297173	956	298046	975	298900	994	299739
938	297220	957	298091	976	298944	995	299783
939	297266	958	298137	977	298989	996	299827
940	297312	959	298182	978	299033	997	299871
941	297358	960	298228	979	299078	998	299915
942	297405	961	298273	980	299122	999	299959
943	297451	962	298319	981	299166	1000	300000

FINIS.

gar.  
211  
255  
299  
343  
387  
431  
475  
519  
563  
607  
651  
694  
738  
782  
825  
869  
913  
956  
990



*Certain Necessary*

# TABLES

USEFUL

## In the Art

OF

## NAVIGATION.



45

# A Table of Meridional parts.

Latit.	lat	lat	lat
D.   M.	D. parts.	D.   D. parts.	D.   D. parts.
0 00	0 000	5 5 006	10 10 051
10	0 167	5 5 174	10 10 220
20	0 333	5 5 341	10 10 390
30	0 500	5 5 508	10 10 559
40	0 667	5 6 676	10 10 729
50	0 833	5 6 843	10 10 898
1 00	1 000	6 6 011	11 11 068
10	1 166	6 6 179	11 11 238
20	1 333	6 6 346	11 11 408
30	1 500	6 6 514	11 11 578
40	1 667	6 6 682	11 11 748
50	1 833	6 6 849	11 11 918
2 00	2 000	7 7 017	12 12 089
10	2 167	7 7 186	12 12 259
20	2 334	7 7 353	12 12 429
30	2 501	7 7 521	12 12 600
40	2 668	7 7 690	12 12 771
50	2 834	7 7 858	12 12 942
3 00	3 001	8 8 026	13 13 113
10	3 169	8 8 195	13 13 284
20	3 335	8 8 363	13 13 455
30	3 503	8 8 531	13 13 627
40	3 669	8 8 700	13 13 798
50	3 836	8 8 868	13 13 969
4 00	4 003	9 9 037	14 14 141
10	4 171	9 9 206	14 14 313
20	4 337	9 9 375	14 14 485
30	4 505	9 9 544	14 14 657
40	4 672	9 9 713	14 14 829
50	4 839	9 9 882	15 15 001
5 00	5 006	10 10 051	15 15 174
			20 20 415

# A Table of Meridional parts.

Latit.	lat	lat	lat
D.   M.	D. parts.	D.   D. parts.	D.   D. parts.
10 00	20 419	25 833	30 31 472
10 10	20 596	26 017	31 664
10 20	20 774	26 200	31 857
10 30	20 952	26 386	32 051
10 40	21 130	26 570	32 244
10 50	21 308	26 755	32 438
11 00	21 486	26 941	32 633
11 10	21 665	27 126	32 827
11 20	21 844	27 312	33 022
11 30	22 023	27 49	33 218
11 40	22 202	27 685	33 413
11 50	22 381	27 871	33 609
12 00	22 561	27 8 058	33 805
12 10	22 741	28 245	34 002
12 20	22 921	28 432	34 199
12 30	22 101	28 620	34 397
12 40	23 282	28 800	34 595
12 50	23 462	28 997	34 792
13 00	23 643	29 185	34 991
13 10	23 824	29 374	35 190
13 20	24 006	29 563	35 389
13 30	24 188	29 753	35 589
13 40	24 369	29 943	35 789
13 50	24 551	30 133	35 990
14 00	24 734	30 323	36 190
14 10	24 916	30 514	36 391
14 20	25 099	30 705	36 593
14 30	25 282	30 896	36 795
14 40	25 465	31 088	36 997
14 50	25 648	31 279	37 200
15 00	25 833	31 472	37 404
15 10	26 017	31 664	37 607
15 20	26 200	31 857	37 811
15 30	26 386	32 051	38 016
15 40	26 570	32 244	38 221
15 50	26 755	32 438	38 426
16 00	26 941	32 633	38 632
16 10	27 126	32 827	38 838
16 20	27 312	33 022	39 044
16 30	27 49	33 218	39 252
16 40	27 685	33 413	39 460
16 50	27 871	33 609	39 668
17 00	28 058	33 805	39 876
17 10	28 245	34 002	40 085
17 20	28 432	34 199	40 294
17 30	28 620	34 397	40 504
17 40	28 800	34 595	40 714
17 50	28 997	34 792	40 925
18 00	29 185	34 991	41 136
18 10	29 374	35 190	41 348
18 20	29 563	35 389	41 560
18 30	29 753	35 589	41 773
18 40	29 943	35 789	41 986
18 50	30 133	35 990	42 200
19 00	30 323	36 190	42 414
19 10	30 514	36 391	42 629
19 20	30 705	36 593	42 844
19 30	30 896	36 795	43 060
19 40	31 088	36 997	43 276
19 50	31 279	37 200	43 493
20 00	31 472	37 404	43 710

# A Table of Meridional parts.

Latit.		lat		lat		lat	
D./M.	D. parts.	D.	D. parts.	D.	D. parts.	D.	D. parts.
40 00	43 710	45 50	497 50	57 905	55	66 129	
	10 43 928		50 733	58 165		66 420	
	20 44 146		50 970	58 425		66 712	
	30 44 365		51 207	58 687		67 006	
	40 44 584		51 445	58 949		67 301	
	50 44 804		51 684	59 212		67 597	
41 00	45 025	46 51	924 51	59 477	56	67 894	
	10 45 246		52 164	59 743		68 193	
	20 45 467		52 405	60 008		68 493	
	30 45 689		52 647	60 276		68 794	
	40 45 912		52 889	60 544		69 097	
	50 46 136		53 132	60 813		69 401	
42 00	46 360	47 53	376 52	61 083	57	69 706	
	10 46 585		53 621	61 314		70 013	
	20 46 810		53 867	61 626		70 321	
	30 47 036		54 113	61 900		70 630	
	40 47 262		54 360	62 174		70 941	
	50 47 489		54 608	62 449		71 253	
43 00	47 717	48 54	856 53	62 726	58	71 567	
	10 47 945		55 106	63 004		71 883	
	20 48 174		55 356	63 282		72 200	
	30 48 403		55 607	63 562		72 517	
	40 48 613		55 859	63 842		72 837	
	50 48 864		56 112	64 124		73 158	
44 00	49 095	49 56	365 54	64 407	59	73 481	
	10 49 327		56 620	64 691		73 805	
	20 49 560		56 875	64 976		74 131	
	30 49 793		57 131	65 263		74 459	
	40 50 027		57 389	65 550		74 788	
	50 50 262		57 646	65 839		75 118	
45 00	50 497	50 57	905 55	66 129	60	75 451	

# A Table of Meridional parts.

Latit.	lat	lat	lat
D.M.	D.parts.	D.	D.parts.
60	00 75 45 165	86 307 70	99 42 75 116 16
	10 75 785	86 702	99 91 116 81
	20 76 121	87 100	100 41 117 46
	30 76 459	87 501	100 90 118 12
	40 76 798	87 904	101 40 118 39
	50 77 139	88 309	101 91 129 47
61	00 77 482 66	88 718 71	102 42 76 220 15
	10 77 826	89 129	102 93 120 85
	20 78 173	89 543	103 45 121 55
	30 78 521	89 959	103 97 122 26
	40 78 871	90 378	104 50 122 97
	50 79 223	90 801	105 03 123 70
62	00 79 577 67	91 226 72	105 57 77 124 44
	10 79 934	91 654	106 11 125 18
	20 80 291	92 084	106 66 125 94
	30 80 651	92 518	107 21 126 70
	40 81 013	92 955	107 77 127 48
	50 81 377	93 395	108 33 128 26
63	00 81 743 68	93 839 73	108 90 78 129 06
	10 82 111	94 285	109 47 129 86
	20 82 481	94 734	110 05 130 68
	30 82 854	95 188	110 63 131 51
	40 83 228	95 644	111 22 132 35
	50 83 605	96 103	111 82 133 21
64	00 83 984 69	96 567 74	112 42 79 134 07
	10 84 365	97 034	113 02 134 95
	20 84 749	97 504	113 64 135 85
	30 85 135	97 978	114 26 136 75
	40 85 523	98 456	114 88 137 68
	50 85 913	98 936	115 52 138 61
65	00 86 307 70	99 422 75	116 16 80 139 56

# The first Table of Rumbs.

Lgs.	100	80	60	40	D	19	18	17	16	15	D
Rumbs.	G.	M.	g.	m.	g.	m.	m.	m.	m.	m.	m.
1	4	59	3	59	2	59	1	59	60	57	54
	4	58	3	58	2	59	1	59	60	57	54
	4	56	3	57	2	58	1	58	59	56	53
	4	54	3	55	2	56	1	57	59	56	53
	4	51	3	53	2	55	1	56	58	56	52
	4	47	3	50	2	52	1	55	57	55	52
	4	42	3	46	2	49	1	53	56	54	51
	4	37	3	42	2	46	1	51	55	53	50
2	4	31	3	37	2	43	1	48	54	52	49
	4	25	3	32	2	39	1	46	53	50	48
	4	17	3	26	2	34	1	43	51	49	46
	4	10	3	20	2	30	1	40	50	47	45
3	4	01	3	13	2	25	1	36	48	46	43
	3	52	3	05	2	19	1	32	46	44	42
	3	42	2	58	2	13	1	28	44	42	40
	3	32	2	50	2	07	1	25	42	40	38
4	3	22	2	41	2	01	1	21	40	38	36
	3	10	2	32	1	54	1	16	38	36	34
	2	59	2	23	1	47	1	12	36	34	32
	2	47	2	14	1	40	1	07	33	32	30
5	2	34	2	03	1	32	1	02	31	29	28
	2	22	1	53	1	25	0	57	28	27	25
	2	18	1	43	1	17	0	52	26	24	23
	1	55	1	32	1	08	0	46	23	22	21
6	1	41	1	20	1	40	0	40	20	19	18
	1	27	1	09	0	52	0	35	17	16	15
	1	13	0	58	0	44	0	30	15	14	13
7	0	59	0	47	0	35	0	24	12	11	10
	0	44	0	36	0	26	0	18	09	08	07
	0	30	0	24	0	18	0	12	06	06	05
	0	15	0	12	0	09	0	06	03	03	02

to find the difference of Latitudes.

D	to find the difference of Latitudes.													Lga
	14	13	12	11	10	9	8	7	6	5	4	3	2	1
m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.
8 45	42	39	36	33	30	27	24	21	18	15	12	09	06	03
8 45	42	39	36	33	30	27	24	21	18	15	12	09	06	03
7 44	42	39	36	33	30	27	24	21	18	15	12	09	06	03
7 44	42	39	36	33	30	27	24	21	18	15	12	09	06	03
7 43	41	38	35	32	29	26	24	21	18	15	12	09	06	03
6 43	41	38	35	32	29	26	23	20	17	15	12	09	06	03
5 42	40	37	34	32	29	26	23	20	17	14	11	09	06	03
4 41	40	37	34	31	28	25	23	20	17	14	11	08	06	03
3 40	39	36	33	31	28	25	22	19	17	14	11	08	06	03
2 39	38	35	33	30	27	24	22	19	16	14	11	09	05	03
1 38	37	34	32	29	26	24	21	19	16	13	11	08	05	03
0 37	36	33	31	28	26	23	21	18	15	13	10	08	05	03
9 36	35	32	30	27	25	22	20	17	15	12	10	07	05	02
7 35	34	31	29	26	24	22	19	17	14	12	10	07	05	02
6 33	33	30	28	26	23	21	19	16	14	12	09	07	05	02
5 32	31	29	27	24	22	20	18	16	13	11	09	07	04	02
4 30	30	28	25	23	21	19	17	15	13	11	08	06	04	02
3 28	28	26	24	22	20	18	16	14	12	10	08	06	04	02
2 27	27	25	23	21	19	17	15	13	11	10	08	06	04	02
1 25	25	23	21	20	18	16	14	13	11	09	07	05	0	02
0 23	23	22	20	19	17	15	13	12	10	08	07	05	03	02
9 22	22	20	18	17	15	14	12	11	09	08	06	0	03	02
8 19	20	18	17	16	14	13	11	10	0	07	06	04	0	01
7 17	18	17	15	14	13	12	10	09	08	06	05	04	03	01
6 15	16	15	14	13	11	10	09	08	0	06	05	03	02	01
5 13	14	13	12	11	10	09	08	07	06	05	04	03	02	01
4 11	12	11	10	10	09	08	07	06	05	04	03	03	02	01
3 09	10	09	09	08	07	08	06	05	04	04	03	0	01	01
2 07	08	08	07	06	06	06	05	04	03	03	02	0	01	01
1 04	06	06	05	05	05	04	04	03	03	02	02	01	01	01
0 02	04	04	04	03	03	03	02	02	02	01	01	01	01	00
	02	02	02	02	01	01	01	01	01	01	01	01	00	00

Rumbs.

1

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# The second Table of Rumbs.

The Second Table of Rumors.									
Latit.		First		Second		Third		Fourth	
gr. m.	Long.	dis.	Long.	dis.	Long.	dis.	Long.	dis.	
0	100	012	0	044	0	076	0	1010	
	200	042	0	084	0	137	0	2010	
	300	062	0	124	0	207	0	3010	
	400	082	0	164	0	276	0	4010	
	500	102	0	205	0	337	0	5010	
1	000	122	0	254	0	407	1	0010	
	100	142	0	294	0	476	1	1010	
	200	162	0	334	0	537	1	2010	
	300	182	0	374	1	007	1	3010	
	400	202	0	414	1	076	1	4010	
	500	222	0	455	1	137	1	5010	
2	000	242	0	504	1	207	2	0010	
	100	262	0	544	1	276	2	1010	
	200	282	0	584	1	337	2	2010	
	300	302	1	024	1	407	2	3010	
	400	322	1	064	1	476	2	4010	
	500	342	1	105	1	537	2	5010	
3	000	362	1	154	2	007	3	0010	
	100	382	1	194	2	076	3	1010	
	200	402	1	234	2	137	3	2010	
	300	422	1	274	2	207	3	3010	
	400	442	1	314	2	276	3	4010	
	500	462	1	354	2	337	3	5010	
4	000	482	1	394	2	407	4	0010	
	100	502	1	435	2	477	4	1010	
	200	522	1	484	2	546	4	2010	
	300	542	1	524	3	007	4	3010	
	400	562	1	564	3	077	4	4010	
	500	582	1	004	3	147	4	5010	
5	000	002	1	044	3	216	5	0010	

to find the difference of Longitudes.

Latit.		Fift		Sixt		Seventh	
gr.	m.	Longit.	dis.	Longit.	dis.	Longit.	dis.
0	10	00	15	15	00	24	14
		00	30	15	00	48	24
		00	45	15	01	12	24
		01	00	15	01	36	24
		01	15	15	02	00	25
1	00	01	29	14	02	25	24
		01	44	15	02	49	24
		01	59	15	03	13	24
		02	14	15	03	37	24
		02	29	15	04	01	24
		02	44	15	04	25	25
2	00	02	59	15	04	50	24
		03	14	15	05	14	24
		03	29	15	05	38	24
		03	44	15	06	02	24
		03	59	15	06	26	24
		04	14	15	06	50	25
3	00	04	29	15	07	15	24
		04	44	15	07	39	24
		04	59	15	08	03	24
		05	14	15	08	27	24
		05	29	15	08	51	24
		05	44	16	09	15	25
4	00	06	00	15	09	40	24
		06	15	15	10	04	24
		06	30	15	10	28	24
		06	45	15	10	53	24
		07	00	15	11	17	24
		01	15	15	11	41	25
5	00	07	30	15	12	50	24

# The second Table of Rumbs.

Latit.	First	Second	Third	Fourth
gr. m.	Long. dif.	Long. dif.	Long. dif.	Long. dif.
5 10 I	02 2	2 03 4	3 27 7	5 10 10
20 I	04 2	2 12 4	3 34 7	5 20 10
30 I	06 2	2 16 4	3 41 7	5 30 10
40 I	08 2	2 20 5	3 48 6	5 40 10
50 I	10 2	2 25 4	3 54 7	5 50 11
6 00 I	12 2	2 29 4	4 01 6	6 01 10
10 I	14 2	2 33 5	4 07 7	6 11 10
20 I	16 2	2 38 4	4 14 7	6 21 10
30 I	18 2	2 42 4	4 21 7	6 31 10
40 I	20 2	2 46 4	4 28 6	6 41 10
50 I	22 2	2 50 5	4 34 7	6 51 10
7 00 I	24 2	2 55 4	4 41 7	7 01 10
10 I	26 2	2 59 4	4 48 7	7 11 10
20 I	28 2	3 03 4	4 55 7	7 21 10
30 I	30 2	3 07 4	5 02 7	7 31 10
40 I	32 2	3 11 4	5 09 6	7 41 10
50 I	34 2	3 14 5	5 15 7	7 51 11
8 00 I	36 2	3 19 5	5 22 7	8 02 10
10 I	38 2	3 24 4	5 29 7	8 12 10
20 I	40 2	3 28 4	5 36 6	8 22 10
30 I	42 2	3 32 4	5 42 7	8 32 10
40 I	44 2	3 36 4	5 49 6	8 42 10
50 I	46 2	3 40 4	5 55 7	8 52 10
9 00 I	48 2	3 44 5	6 02 7	9 02 10
10 I	50 2	3 49 4	6 09 7	9 12 10
20 I	52 2	3 53 4	6 16 7	9 22 10
30 I	54 2	3 57 4	6 23 7	9 33 10
40 I	56 2	4 01 5	6 30 6	9 43 11
50 I	58 2	4 06 4	6 36 7	9 54 10
10 00 2	00 2	4 10 4	6 43 7	10 03 10

to find the difference of Longitudes.

Latit.		Fift		Sixt		Seventh	
gr. m.	Long.	dis.	Long.	dis.	Long.	dis.	
5	10 07	45 15	12 29	24	26 01	50	
	20 08	00 15	12 53	25	26 51	50	
	30 08	15 15	13 18	24	27 41	51	
	40 08	30 15	13 42	24	28 32	51	
	50 08	44 15	14 06	25	29 23	50	
6	00 09	00 15	14 31	24	30 13	51	
	10 09	15 15	14 55	24	31 04	50	
	20 09	30 15	15 19	25	31 54	51	
	30 09	45 15	15 44	24	32 45	50	
	40 10	00 15	16 08	24	33 35	50	
	50 10	15 15	16 32	24	34 25	51	
7	00 10	30 15	16 56	24	35 16	51	
	10 10	45 15	17 20	24	36 07	51	
	20 11	00 15	17 44	25	36 58	51	
	30 11	15 15	18 09	24	37 49	50	
	40 11	30 15	18 33	24	38 39	50	
	50 11	45 16	18 57	25	39 29	51	
8	00 12	01 15	19 21	24	40 20	51	
	10 12	16 15	19 46	25	41 11	51	
	20 12	31 15	20 11	25	42 02	51	
	30 12	46 15	20 36	24	42 53	50	
	40 13	01 15	21 00	24	43 43	51	
	50 13	16 15	21 24	25	44 34	51	
9	00 13	31 15	21 49	24	45 25	51	
	10 13	46 15	22 13	24	46 16	51	
	20 14	01 15	22 37	25	47 07	51	
	30 14	16 16	23 02	24	47 58	51	
	40 14	32 15	23 26	25	48 49	51	
	50 14	47 15	23 51	25	49 40	51	
10	00 15	02 15	24 16	24	50 31	51	

H

# The second Table of Rumbs.

Latit.	First	Second	Third	Fourth				
gr. m.	Long.	dif.	Long.	dif.	Long.	dif.	Long.	dif.
10	10 1	02 1	4	14 4	6	50 7	10	13 10
	20 2	04 2	4	18 4	6	57 6	10	23 11
	30 2	06 2	4	22 4	7	03 7	10	34 10
	40 2	08 2	4	26 5	7	10 7	10	44 10
	50 2	10 2	4	31 4	7	17 6	10	54 10
11	00 2	11 2	4	35 4	7	23 7	11	04 10
	10 2	14 2	4	39 4	7	30 7	11	14 10
	20 2	16 2	4	43 5	7	37 7	11	24 11
	30 2	18 2	4	48 4	7	44 7	11	35 10
	40 2	20 2	4	52 4	7	51 7	11	45 10
	50 2	22 2	4	56 5	7	58 6	11	55 10
12	00 2	24 2	5	01 4	8	04 7	12	05 10
	10 2	26 2	5	05 4	8	11 7	12	15 10
	20 2	28 2	5	09 4	8	18 7	12	25 11
	30 2	30 2	5	13 5	8	25 7	12	36 10
	40 2	32 2	5	18 4	8	32 7	12	46 10
	50 2	34 2	5	22 4	8	39 7	12	56 11
13	00 2	37 2	5	26 4	8	46 6	13	07 10
	10 2	39 2	5	30 4	8	52 7	13	17 10
	20 2	41 2	5	34 4	8	59 7	13	27 11
	30 2	43 2	5	38 5	9	06 7	13	38 10
	40 2	45 2	5	43 4	9	13 7	13	48 10
	50 2	47 2	5	47 4	9	20 7	13	58 10
14	00 2	49 2	5	51 4	9	27 7	14	08 10
	10 2	51 2	5	55 5	9	34 7	14	18 10
	20 2	53 2	6	00 4	9	41 7	14	28 11
	30 2	55 2	6	04 4	9	48 6	14	39 10
	40 2	57 2	6	08 5	9	54 7	14	49 10
	50 2	59 2	6	13 4	10	01 7	14	59 11
15	00 3	01 2	6	17 4	10	08 7	15	10 10

to find the difference of Longitudes.

Latit.	Fift		Sixt		Seventh	
	gr.	m.	Long.	diff.	Long.	diff.
3 10	10	15	17 15	24	40 24	51 22 52
3 11	10	15	32 16	25	04 25	52 14 51
4 10	30	15	48 13	25	29 24	53 05 51
4 10	40	16	03 15	25	53 25	53 56 51
4 10	50	16	18 16	26	18 25	54 47 51
4 10	11 00	16	34 15	26	43 24	55 38 51
4 10	10	16	49 16	27	07 25	56 29 51
4 11	20	17	05 15	27	32 25	57 20 52
5 10	30	17	20 15	27	57 24	58 12 51
5 10	40	17	35 15	28	21 24	59 03 51
5 10	50	17	50 15	28	45 25	59 54 52
5 10	12 00	18	05 15	29	10 25	60 46 51
5 10	10	18	20 15	29	35 25	61 37 51
5 11	20	18	25 16	30	00 25	62 28 52
6 10	30	18	51 15	30	25 24	63 20 51
6 10	40	19	06 15	30	49 25	64 11 52
6 11	50	19	21 16	31	14 25	65 03 52
7 10	13 00	19	37 15	31	39 25	65 55 52
7 10	10	19	52 16	32	04 25	66 47 51
7 11	20	20	08 15	32	29 25	67 38 52
8 10	30	20	23 15	32	54 24	68 30 51
8 10	40	20	38 16	33	18 25	69 21 52
8 10	50	20	54 16	33	43 25	70 13 52
8 10	14 00	21	10 15	34	08 25	71 05 52
8 11	10	21	25 15	34	33 25	71 57 52
9 10	20	21	40 16	34	58 25	72 49 52
9 10	30	21	56 15	35	23 25	73 41 52
9 10	40	22	11 15	35	48 25	74 33 52
9 11	50	22	26 16	36	13 25	75 25 52
10 10	15 00	22	42 15	36	38 25	76 17 52

# The Second Table of Rumbs.

Latit.	First	Second	Third	Fourth				
Gr. m.	Long.	dis.	Long.	dis.	Long.	dis.	Long.	dis.
15	103	032	6	215	10	157	15	2010
	203	052	6	254	10	227	15	3011
	303	072	6	304	10	297	15	4111
	403	092	6	345	10	367	15	5110
	503	112	6	394	10	437	16	0211
16	003	132	6	434	10	507	16	1310
	103	152	6	474	10	577	16	2310
	203	172	6	515	11	047	16	2311
	303	193	6	564	11	117	16	4410
	403	212	7	004	11	187	16	5410
17	503	242	7	044	11	257	17	0411
	003	262	7	085	11	327	17	1510
	103	282	7	134	11	397	17	2510
	203	302	7	174	11	467	17	3511
	303	322	7	215	11	537	17	4610
18	403	342	7	264	12	007	17	5611
	503	363	7	305	12	077	18	0711
	003	382	7	354	12	147	18	1810
	103	402	7	394	12	217	18	2811
	203	422	7	434	12	287	18	3911
19	303	442	7	475	12	357	18	5010
	403	462	7	525	12	427	19	0010
	503	492	7	574	12	497	19	1011
	003	512	8	014	12	567	19	2110
	103	532	8	055	13	037	19	3111
20	203	552	8	104	13	107	19	4211
	303	572	8	144	13	177	19	5310
	403	592	8	185	13	247	20	0311
	504	012	8	234	13	317	20	1411
	004	042	8	275	13	387	20	2510

to find the difference of Longitudes.

Latit.		Fift		Sixt		Seventh	
gr. m.	Long.	dif.	Long.	dif.	Long.	dif.	
15	10 22	57	16 37	03	25 77	09	52
	20 23	13	15 37	28	25 78	01	52
	30 23	28	16 37	53	25 78	53	52
	40 23	44	16 38	18	25 79	43	52
	50 24	00	16 38	43	25 80	37	52
16	00 24	16	15 39	08	25 81	30	52
	10 24	31	16 39	33	25 82	22	52
	20 24	47	16 39	58	26 83	14	53
	30 25	03	15 40	24	25 84	07	52
	40 25	18	15 40	48	25 84	59	53
	50 25	33	16 41	14	25 85	52	53
17	00 25	49	15 41	39	25 86	45	52
	10 26	04	16 42	04	25 87	37	52
	20 26	20	16 42	29	26 88	29	53
	30 26	36	15 42	55	25 89	22	53
	40 26	51	16 43	20	25 90	15	53
	50 27	07	16 43	45	26 91	08	53
18	00 27	23	16 44	11	25 92	01	53
	10 27	39	16 44	36	25 92	54	53
	20 27	55	16 45	01	26 93	47	53
	30 28	11	15 45	27	25 94	40	53
	40 28	26	16 45	52	26 95	33	53
	50 28	42	16 46	14	26 96	29	53
19	00 28	58	16 46	44	25 97	19	53
	10 29	14	16 47	09	26 98	12	53
	20 29	30	16 47	35	26 99	05	54
	30 29	46	15 48	01	25 99	59	53
	40 30	01	16 48	26	25 100	52	53
	50 30	17	16 48	51	26 101	45	53
20	00 30	33	16 49	17	26 102	38	54

# The second Table of Rumbs.

Latit.	First		Second		Third		Fourth	
gr. m.	Long.	diff.	Long.	diff.	Long.	diff.	Long.	diff.
20 10 4	06 3		08 31 4		13 45 7		20 35 11	
20 4	09 2		08 36 5		13 52 8		20 46 11	
30 4	11 2		08 41 5		14 00 7		20 57 10	
40 4	13 2		08 46 4		14 07 7		21 07 11	
50 4	15 2		08 50 4		14 14 7		21 18 11	
21 00 4	17 2		08 54 4		14 21 7		21 29 10	
10 4	19 2		08 58 5		14 28 8		21 39 11	
20 4	21 2		09 03 5		14 36 7		21 50 11	
30 4	23 2		09 08 4		14 43 7		22 01 11	
40 4	25 2		09 12 4		14 50 7		22 12 11	
50 4	27 2		09 16 4		14 57 7		22 23 11	
22 00 4	29 2		09 20 5		15 04 7		22 34 10	
10 4	31 2		09 25 5		15 11 7		22 44 11	
20 4	33 2		09 30 4		15 18 8		22 55 11	
30 4	35 2		09 34 4		15 26 7		23 06 10	
40 4	37 3		09 38 5		15 33 8		23 16 11	
50 4	40 2		09 43 4		15 41 7		23 27 11	
23 00 4	42 2		09 47 5		15 48 7		23 38 11	
10 4	44 2		09 52 5		15 55 8		23 49 11	
20 4	46 2		09 57 5		16 03 7		24 00 11	
30 4	48 3		10 02 4		16 10 7		24 11 11	
40 4	51 2		10 06 4		16 17 8		24 22 11	
50 4	53 2		10 10 4		16 25 7		24 33 11	
24 00 4	55 2		10 14 5		16 32 7		24 44 11	
10 4	57 2		10 19 5		16 39 7		24 55 11	
20 4	59 3		10 24 5		16 46 7		25 06 11	
30 5	05 2		10 29 4		16 53 8		25 17 11	
40 5	04 2		10 33 4		17 01 7		25 28 11	
50 5	06 2		10 37 5		17 08 8		25 39 11	
25 00 5	08 2		10 42 5		17 16 7		25 05 11	

to find the difference of Longitudes

Latit.	First	Sixt	Seventh.			
gr.m.	Long.	dis.	Long.	dis.	Long.	dis.
30	1030	4916	49	4326	103	3254
	2031	0516	50	0926	104	2654
	3031	2116	50	3525	105	2053
	4031	3716	51	0026	106	1354
	5031	5316	51	2926	107	0754
31	0032	0916	51	5226	108	0154
	1032	2516	52	1826	108	5554
	2032	4116	52	4426	109	4955
	3032	5716	53	1026	110	4354
	4033	1316	53	3626	111	3755
	5033	2917	54	0226	112	3155
22	0033	4616	54	2826	113	2554
	1034	0216	54	5426	114	1954
	2034	1816	55	2026	115	1355
	3034	3416	55	4626	116	0854
	4034	5016	56	1226	117	0255
	5035	0617	56	3827	117	5755
23	0035	2316	57	0526	118	5254
	1035	3916	57	3126	119	4655
	2035	5517	57	5726	120	4155
	3036	1216	58	2426	121	3655
	4036	2816	58	5026	122	3155
	5036	4417	59	1627	123	2655
24	0037	0116	59	4326	124	2155
	1037	1716	60	0926	125	1655
	2037	3317	60	3527	126	1155
	3037	5016	61	0226	127	0655
	4038	0617	61	2827	128	0155
	5038	2317	61	5527	128	5656
25	0038	4016	62	2226	129	5255

# The second Table of Rumbs.

Latit.	First		Second		Third		Fourth	
gr. m.	Long.	diff.	Long.	diff.	Long.	diff.	Long.	diff.
25 10 5	10 1		10 47 4		17 23 7		26 01 11	
20 5	12 1		10 51 5		17 30 8		26 12 11	
30 5	14 3		10 56 5		17 38 7		26 23 11	
40 5	17 2		11 01 4		17 45 9		26 34 11	
50 5	19 2		11 05 5		17 52 8		26 45 11	
26 00 5	21 2		11 10 4		18 00 7		26 56 11	
10 5	23 2		11 14 4		18 07 8		27 07 11	
20 5	25 2		11 18 5		18 15 8		27 18 11	
30 5	27 3		11 23 5		18 23 7		27 29 11	
40 5	30 2		11 28 5		18 30 7		27 40 11	
50 5	32 2		11 33 4		18 37 8		27 51 12	
27 00 5	34 2		11 37 5		18 45 7		28 03 11	
10 5	36 3		11 42 5		18 52 7		28 14 11	
20 5	39 2		11 47 4		18 59 8		28 25 12	
30 5	41 2		11 51 5		19 07 8		28 37 11	
40 5	43 3		11 56 5		19 15 7		28 48 11	
50 5	46 2		12 01 4		19 22 8		28 59 12	
28 00 5	48 2		12 05 5		19 30 7		29 11 11	
10 5	50 2		12 10 5		19 37 8		29 22 11	
20 5	52 3		12 15 5		19 45 8		29 33 12	
30 5	55 2		12 20 4		19 53 7		29 45 11	
40 5	57 3		12 24 5		20 00 8		29 56 11	
50 6	06 2		12 29 4		20 08 8		30 07 12	
29 00 6	02 2		12 33 5		20 16 7		30 19 11	
10 6	04 3		12 38 5		20 23 8		30 30 12	
20 6	07 2		12 43 5		20 31 8		30 42 12	
30 6	09 2		12 48 5		20 39 7		30 54 11	
40 6	11 2		12 53 4		20 46 8		31 05 11	
50 6	13 3		12 57 5		20 54 8		31 16 12	
30 00 6	16 2		12 02 5		20 02 7		31 28 11	

to find the difference of Longitudes.

Latit.		Fift		Sixt		Seventh	
Gr.	m.	Long.	dif.	Long.	dif.	Long.	dif.
40	10	38	59 16	62	48 27	130	47 56
	20	39	12 17	63	15 27	131	43 56
	30	39	29 16	63	42 26	132	39 56
	40	39	45 17	64	08 27	133	34 56
	50	40	02 17	64	35 27	134	30 56
41	00	40	19 16	65	02 27	135	26 56
	10	40	35 17	65	29 27	136	22 56
	20	40	52 17	65	59 27	137	18 56
	30	41	09 17	66	23 27	138	14 56
	40	41	26 17	66	50 27	139	10 56
	50	41	43 17	67	17 27	140	06 57
42	00	42	00 16	67	44 27	141	03 56
	10	42	16 17	68	11 27	141	59 57
	20	42	33 17	68	38 28	142	56 57
	30	42	50 16	69	06 27	143	53 56
	40	43	06 17	69	33 27	144	49 57
	50	43	23 17	70	00 28	145	46 57
43	00	43	40 17	70	28 27	146	43 57
	10	43	57 17	70	56 27	147	40 57
	20	44	14 18	71	22 28	148	37 57
	30	44	32 17	71	50 27	149	34 57
	40	44	49 17	72	17 27	150	31 57
	50	45	06 17	72	44 28	151	28 58
44	00	45	23 17	73	12 27	152	26 58
	10	45	40 17	73	39 28	153	24 58
	20	45	57 17	74	07 28	154	22 58
	30	46	14 17	74	35 28	155	20 58
	40	46	31 17	75	03 28	156	18 58
	50	46	48 18	75	31 28	157	16 58
45	00	47	06 17	75	59 28	158	14 58

# The second Table of Rumbs.

Latit.	First	Second	Third	Fourth
gr. m.	Long. dif.	Long. dif.	Long. dif.	Long. dif.
30	10 6 18 2	13 7 5	25 09 8	31 39 12
	20 6 20 2	13 12 4	25 17 8	31 51 12
	30 6 22 3	13 16 5	25 25 7	32 03 11
	40 6 25 2	13 21 5	25 32 8	32 14 12
	50 6 27 2	13 26 5	25 40 8	32 26 12
31	00 6 29 3	13 31 5	25 48 8	32 38 11
	10 6 32 2	13 36 5	25 56 8	32 49 12
	20 6 34 3	13 41 5	26 04 8	33 01 12
	30 6 37 2	13 46 5	26 12 7	33 13 11
	40 6 39 2	13 51 5	26 19 8	33 24 12
	50 6 41 2	13 56 4	26 27 8	33 36 12
32	00 6 43 3	14 00 5	26 35 8	33 48 12
	10 6 46 2	14 05 5	26 43 8	34 00 12
	20 6 48 3	14 10 5	26 51 8	34 12 12
	30 6 51 2	14 15 5	26 59 8	34 24 11
	40 6 53 2	14 20 4	27 07 8	34 35 12
	50 6 55 3	14 24 5	27 15 8	34 47 12
33	00 6 58 2	14 29 5	27 23 8	34 59 12
	10 7 00 3	14 34 5	27 31 8	35 11 12
	20 7 03 2	14 39 6	27 39 8	35 23 12
	30 7 05 3	14 45 5	27 47 8	35 35 12
	40 7 08 2	14 50 5	27 55 8	35 47 12
	50 7 10 2	14 55 5	28 03 8	35 59 12
34	00 7 12 2	15 00 5	28 11 8	36 11 12
	10 7 14 3	15 05 4	28 19 8	36 23 12
	20 7 17 3	15 09 5	28 27 8	36 35 13
	30 7 20 2	15 14 5	28 35 8	36 48 12
	40 7 22 2	15 19 5	28 43 8	37 00 12
	50 7 24 2	15 24 6	28 51 9	37 12 12
35	00 7 26 3	15 30 5	28 00 8	37 24 12

to find the difference of Longitudes.

Latit.	Fift	Sixt	Seventh		
gr. m.	Long. dif.	Long. dif.	Long. dif.		
30	10 47 23 17	76 27 18	159 12 58		
20	47 40 18	76 55 28	160 10 58		
10	47 58 17	77 23 28	161 08 58		
40	48 15 17	77 51 28	162 06 59		
50	48 32 18	78 19 28	163 05 59		
31	50 48 50 17	78 47 28	164 04 58		
10	49 07 18	79 15 28	165 02 59		
20	49 25 18	79 43 29	166 01 59		
30	49 43 17	80 11 28	167 00 59		
40	50 00 18	80 40 28	167 59 59		
50	50 18 18	81 08 29	168 58 50		
32	50 50 36 17	81 37 28	169 58 59		
10	50 53 17	82 05 28	170 57 59		
20	51 10 18	82 33 29	171 56 59		
30	51 28 18	83 02 29	172 55 60		
40	51 46 18	83 31 29	173 55 60		
50	52 04 18	84 00 29	174 55 60		
33	52 22 18	84 29 28	175 55 60		
10	52 40 18	84 57 29	176 55 60		
20	52 58 18	85 26 29	177 55 60		
30	53 16 18	85 55 29	178 55 60		
40	53 34 18	86 24 29	179 55 61		
50	53 52 18	86 53 29	180 56 61		
34	54 10 18	87 22 29	181 57 60		
10	54 28 18	87 51 29	182 57 61		
20	54 46 18	88 20 30	183 58 61		
30	55 04 18	88 50 29	184 59 61		
40	55 22 18	89 19 29	186 00 61		
50	55 40 19	89 48 30	187 01 61		
35	55 59 16	90 18 2	188 02 61		

# The second Table of Rumbs.

Latit.		First		Second		Third		Fourth	
gr.	m.	Long.	dif.	Long.	dif.	Long.	dif.	Long.	dif.
35	10	7	293	15	355	25	088	37	3612
	20	7	313	15	405	25	148	37	4813
	30	7	341	15	455	25	248	38	0112
	40	7	363	15	505	25	328	38	5312
	50	7	391	15	555	25	409	38	2513
36	00	7	412	16	005	25	498	38	3812
	10	7	433	16	056	25	578	38	5012
	20	7	462	16	115	26	069	39	0213
	30	7	483	16	165	26	148	39	1512
	40	7	512	16	215	26	228	39	2712
37	50	7	532	16	265	26	308	39	3613
	00	7	553	16	315	26	388	39	5212
	10	7	583	16	365	26	469	40	0413
	20	8	012	16	416	26	559	40	1713
	30	8	033	16	475	27	048	40	3012
38	40	8	062	16	525	27	128	40	4213
	50	8	083	16	575	27	209	40	5513
	00	8	113	17	025	27	298	41	0812
	10	8	142	17	075	27	379	41	2013
	20	8	163	17	126	27	469	41	3313
39	30	8	192	17	186	27	558	41	4613
	40	8	213	17	245	28	038	41	5913
	50	8	242	17	295	28	119	42	1213
	00	3	263	17	345	28	208	42	2513
	10	8	292	17	395	28	289	42	1213
40	20	8	313	17	445	28	379	42	1313
	30	8	343	17	496	28	469	43	1213
	40	8	372	17	556	28	559	43	1213
	50	8	393	18	015	28	049	43	1313
	00	8	422	18	066	28	138	43	1213

to find the difference of Longitudes.

Latit.		Fift		Sixt		Seventh	
gr.m.	Longit.	dis.	Longit.	dis.	Longit.	dis.	
35	10 56 17	18 90 47	30	189 03 62			
	20 56 35	19 91 17	30	190 05 62			
	30 56 54	18 91 47	29	191 07 62			
	40 57 12	18 92 16	30	192 09 62			
	50 57 30	19 92 46	30	193 11 62			
36	00 57 49	18 93 16	30	194 13 62			
	10 58 07	19 93 46	30	195 15 62			
	20 58 26	19 94 16	30	196 17 63			
	30 58 45	18 94 46	30	197 20 62			
	40 59 03	19 95 16	30	198 23 63			
37	50 59 22	19 95 46	30	199 25 63			
	00 59 41	18 96 16	30	200 28 63			
	10 59 59	19 96 46	30	201 31 63			
	20 60 18	19 97 16	30	202 34 63			
	30 60 37	19 97 47	31	203 37 64			
38	40 60 56	19 98 17	30	204 41 64			
	50 61 15	19 98 48	31	205 45 64			
	00 61 34	19 99 19	30	206 49 63			
	10 61 53	19 99 49	31	207 52 64			
	20 62 12	19 100 20	31	208 56 64			
39	30 62 31	19 100 51	31	210 00 64			
	40 62 50	19 101 22	31	211 04 65			
	50 63 09	20 101 53	31	212 09 65			
	00 63 29	19 102 24	31	213 14 64			
	10 63 48	19 102 55	31	214 18 65			
40	20 64 07	20 103 26	31	215 23 65			
	30 64 27	19 103 57	31	216 28 65			
	40 64 46	19 104 28	31	217 33 66			
	50 65 05	20 104 59	32	218 39 66			
	00 65 25	19 105 31	31	219 45 65			

# The second Table of Rumbs.

Latit.	First	Second	Third	Fourth
gr. m.	Long. dif.	Long. dif.	Long. dif.	Long. dif.
40 10 8	44 1	18 12 6	29 21 9	43 36 13
20 8	47 2	18 18 5	29 30 9	44 06 13
30 8	49 3	18 23 5	29 39 8	44 22 13
40 8	52 2	18 28 6	29 47 9	44 35 13
50 8	54 3	18 34 5	29 56 9	44 48 14
41 00 8	57 3	18 39 5	30 05 9	45 01 13
10 9	00 3	18 44 6	30 14 9	45 15 13
20 9	03 3	18 05 6	30 23 9	45 28 13
30 9	06 2	18 56 5	30 32 9	45 41 13
40 9	08 3	19 01 5	30 41 9	45 54 14
50 9	11 2	19 06 6	30 50 9	46 08 14
42 00 9	13 3	19 12 6	30 59 9	46 22 13
10 9	16 2	19 18 5	31 08 9	46 35 13
20 9	18 3	19 13 6	31 17 9	46 48 14
30 9	21 3	19 29 6	31 26 9	47 02 13
40 9	24 3	19 35 5	31 35 9	47 15 14
50 9	27 2	19 40 6	31 44 9	47 29 14
43 00 9	30 3	19 46 6	31 53 9	47 42 13
10 9	32 3	19 52 5	32 02 9	47 56 14
20 9	35 2	19 57 6	32 11 9	48 10 14
30 9	33 3	20 03 6	32 20 9	48 24 14
40 9	40 3	20 09 6	32 29 9	48 38 14
50 9	43 3	20 15 5	32 38 10	48 52 14
44 00 9	46 2	20 20 6	32 48 9	49 06 14
10 9	48 3	20 26 6	32 57 9	49 20 14
20 9	51 3	20 32 6	33 06 10	49 34 14
30 9	54 3	20 38 6	33 16 9	49 48 14
40 9	57 3	20 44 6	33 25 9	50 02 14
50 10	00 3	20 50 5	33 34 10	50 16 14
45 00 10	03 3	20 55 6	33 44 9	50 30 14

to find the difference of Longitudes.

Latit.	Fift		Sixt		Seventh	
gr.m.	Longit.	dif.	Longit.	dif.	Longit.	dif.
40	10 65	44	20	106 02	32	220 50 66
	20 66	08	20	106 34	32	221 56 66
	30 66	24	19	107 06	32	223 02 66
	40 66	44	20	107 38	32	224 08 67
	50 67	03	20	108 10	32	225 15 67
41	00 67	23	20	108 42	32	226 22 66
	10 67	43	20	109 14	32	227 28 67
	20 68	03	20	109 46	32	228 35 67
	30 68	23	20	110 18	32	229 42 67
	40 68	43	20	110 50	32	230 49 67
	50 69	03	20	111 22	33	231 56 68
42	00 69	23	20	111 55	32	233 04 68
	10 69	43	20	112 27	33	234 12 68
	20 70	03	20	113 00	32	235 20 68
	30 70	23	20	113 33	33	236 28 68
	40 70	43	21	114 05	33	237 36 68
	50 71	04	21	114 38	33	238 44 69
43	00 71	25	20	115 11	33	239 53 69
	10 71	45	20	115 44	33	241 02 69
	20 72	05	21	116 17	34	242 11 69
	30 72	26	20	116 51	33	243 20 69
	40 72	46	21	117 24	33	244 29 70
	50 73	07	21	117 57	34	245 39 70
44	00 73	28	21	118 31	34	246 49 70
	10 73	49	21	119 05	34	247 59 70
	20 74	10	21	119 39	34	249 09 70
	30 74	31	20	120 13	34	250 19 71
	40 74	51	21	120 47	34	251 30 71
	50 75	12	22	121 21	34	252 41 71
45	00 75	34	21	121 55	34	253 52 71

# The second Table of Rumbs.

Zatit.	First	Second	Third	Fourth				
gr. m.	Long.	dif.	Long.	dif.	Long.	dif.	Long.	dif.
45	10 10 06 2	21 01 6	33 53 10	50 44 14				
	20 10 08 3	21 07 6	34 03 10	50 58 14				
	30 10 11 3	21 13 6	34 13 09	51 12 14				
	40 10 14 3	21 19 5	34 22 09	51 26 15				
	50 10 17 3	21 24 6	34 31 10	51 41 15				
46	00 10 20 2	21 20 6	34 41 10	51 56 14				
	10 10 22 3	21 36 6	34 51 10	52 10 14				
	20 10 25 3	21 42 6	35 01 10	52 24 15				
	30 10 28 3	21 48 6	35 11 09	52 39 14				
	40 10 31 3	21 54 6	35 20 10	52 53 14				
	50 10 34 3	22 00 7	35 30 10	53 07 15				
47	00 10 37 3	22 07 6	35 40 09	53 22 15				
	10 10 40 3	22 13 6	35 49 10	53 37 15				
	20 10 43 2	22 19 6	35 59 10	53 52 15				
	30 10 45 3	22 25 6	36 09 10	54 07 14				
	40 10 48 3	22 31 6	36 19 10	54 21 15				
	50 10 51 4	22 37 6	36 29 10	54 36 15				
48	00 10 55 3	22 43 6	36 39 10	54 51 15				
	10 10 58 3	22 49 7	36 49 10	55 06 15				
	20 11 01 3	22 56 6	36 59 10	55 21 15				
	30 11 04 3	23 02 6	37 09 10	55 36 15				
	40 11 07 3	23 08 7	37 19 10	55 51 15				
	50 11 10 3	23 15 6	37 29 11	56 06 16				
49	00 11 13 3	23 21 6	37 40 10	56 21 15				
	10 11 16 3	23 27 0	37 50 10	56 37 15				
	20 11 19 3	23 33 6	38 00 10	56 52 16				
	30 11 22 3	23 39 6	38 10 10	57 08 15				
	40 11 25 3	23 45 7	38 20 10	57 33 15				
	50 11 28 3	23 52 7	38 30 11	57 38 16				
50	00 11 31 3	23 59 6	38 41 10	57 45 15				

to find the difference of Longitudes.

First		Sixt		Seventh	
Lat.	Long.	Lat.	Long.	Lat.	Long.
45 10 75	55 21	122 29 34	255 03 71		
20 76	16 22	123 03 34	256 14 72		
30 76	38 21	123 37 34	257 26 72		
40 76	59 22	124 11 35	258 38 72		
50 77	21 23	124 46 35	259 50 72		
46 00 77	43 21	125 21 35	261 02 72		
10 78	04 22	125 56 35	262 14 73		
20 78	25 22	126 31 35	263 27 73		
30 78	47 22	127 06 35	264 40 73		
40 79	09 22	127 41 35	265 53 73		
50 79	31 22	128 16 36	267 06 74		
47 00 79	53 22	128 51 35	268 20 74		
10 80	15 22	129 27 35	269 34 74		
20 80	37 22	130 02 36	270 48 75		
30 80	59 22	130 38 36	272 03 74		
40 81	21 23	131 14 36	273 17 75		
50 81	43 23	131 50 36	274 32 75		
48 00 82	05 22	132 26 36	275 47 75		
10 82	27 23	133 02 36	277 02 75		
20 82	50 23	133 38 37	278 17 76		
30 83	13 22	134 15 36	279 33 76		
40 83	35 23	134 51 37	280 49 77		
50 83	58 23	135 28 37	282 06 77		
49 00 84	21 23	136 05 36	283 23 76		
10 84	44 23	136 41 37	284 39 77		
20 85	07 23	137 18 37	285 56 77		
30 85	30 23	137 55 37	287 13 78		
40 85	53 23	138 32 38	288 31 78		
50 86	16 24	139 10 38	289 49 78		
50 00 86	40 23	139 48 37	291 07 78		

# The second Table of Rumbs.

Latit.		First		Second		Third		Fourth	
gr.	m.	Long.	dis.	Long.	dis.	Long.	dis.	Long.	dis.
50	10	11	34 3	24	06 7	38	51 11	58	29 16
	20	11	37 3	24	12 7	39	02 11	58	25 16
	30	11	40 4	24	19 7	39	13 10	58	41 16
	40	11	44 3	24	26 6	39	23 10	58	56 15
	50	11	47 3	24	32 6	39	33 11	59	12 16
51	00	11	50 3	24	38 7	39	44 10	59	28 16
	10	11	53 3	24	45 6	39	54 11	59	44 16
	20	11	56 4	24	51 7	40	05 11	60	00 16
	30	12	00 3	24	58 7	40	16 11	60	16 16
	40	12	03 3	25	05 7	40	27 11	60	32 16
52	50	12	06 3	25	12 6	40	38 11	60	48 17
	00	12	09 3	25	18 7	40	49 11	61	05 16
	10	12	12 3	25	25 7	41	00 11	61	21 16
	20	12	15 4	25	32 7	41	11 11	61	37 17
	30	12	19 3	25	39 6	41	22 11	61	54 16
53	40	12	22 3	25	45 7	41	33 11	62	10 17
	50	12	25 3	25	52 7	41	44 11	62	27 17
	00	12	28 4	25	59 7	41	55 11	62	44 16
	10	12	32 4	26	06 7	42	06 11	63	00 17
	20	12	36 3	26	13 7	42	17 11	63	17 17
54	30	12	39 3	26	20 7	42	28 11	63	34 16
	40	12	42 3	26	27 7	42	39 11	63	50 17
	50	12	45 4	26	34 7	42	50 12	64	07 17
	00	12	49 3	26	41 7	43	02 11	64	24 17
	10	12	52 4	26	48 7	43	13 11	64	41 17
55	20	12	56 3	26	55 7	43	24 12	64	58 18
	30	12	59 3	27	02 7	43	36 11	65	16 17
	40	13	02 4	27	09 7	43	47 12	65	33 17
	50	13	06 4	27	16 7	43	59 12	65	50 18
	00	13	10 3	27	23 7	43	11 11	66	08 17

to find the difference of Longitudes. IT

Lat.	Fifth		Sixth		Seventh		Eighth	
	Long.	dis.	Long.	dis.	Long.	dis.	Long.	dis.
16	10 87	03 23	140 25	38	192 35	78	244 01	22
16	20 87	16 24	141 03	38	193 43	79	245 02	
16	30 87	30 23	141 41	38	195 16	79	246 07	
15	40 88	13 24	142 19	38	196 51	80	247 04	
16	50 88	37 24	142 57	38	197 41	80	248 07	
16	00 89	01 23	143 35	38	199 01	80	249 00 27	
16	10 89	24 24	144 13	39	300 21	80	250 01	
16	20 89	48 24	144 51	39	301 41	81	251 02	
16	30 90	12 24	145 31	39	303 02	81	252 02	
16	40 90	36 24	146 10	39	304 23	81	253 04	
17	50 91	00 25	146 49	39	305 44	81	254 07	
16	00 91	25 24	147 28	39	307 05	82	255 00	27
16	10 91	49 24	148 07	39	308 27	82	256 01	
17	20 92	13 25	148 46	40	309 49	83	257 02	
16	30 92	38 24	149 26	40	311 12	83	258 02	
17	40 93	02 25	150 06	40	312 34	83	259 04	
17	50 93	27 25	150 46	40	313 57	83	260 07	
16	00 93	52 25	151 26	40	315 20	84	261 00 27	
17	10 94	17 25	152 06	40	316 44	84	262 01	
17	20 94	42 26	152 46	41	318 08	85	263 03	
16	30 95	08 25	153 27	40	319 33	84	264 02	
17	40 95	33 25	154 07	41	320 57	85	265 04	
17	50 96	58 25	154 48	41	322 22	85	266 07	
17	00 96	23 25	155 29	41	323 47	86	267 00 27	
17	10 96	48 26	156 10	41	325 13	86	268 01	
18	20 97	14 26	156 51	42	326 39	87	269 03	
17	30 97	40 26	157 33	42	328 06	87	270 02	
17	40 98	06 26	158 15	42	329 33	87	271 04	
18	50 98	32 26	158 57	42	331 00	87	272 07	
17	00 98	58 26	159 39	42	332 27	88	273 00 27	

# The second Table of Rumbz.

Latit.		First		Second		Third		Fourth	
gr.	m.	Long.	dis.	Long.	dis.	Long.	dis.	Long.	dis.
55	10	13	133	27	308	44	22	13	66
	20	13	164	27	387	44	34	12	66
	30	13	203	27	457	44	46	12	67
	40	13	234	27	528	44	58	12	67
	50	13	273	28	607	45	10	12	67
56	00	13	303	28	678	45	22	12	67
	10	13	334	28	198	45	34	12	68
	20	13	374	28	237	45	46	12	68
	30	13	413	28	307	45	58	12	68
	40	13	444	28	378	46	10	12	69
57	50	13	484	28	457	46	22	12	69
	00	13	524	28	528	46	34	12	69
	10	13	568	29	008	46	47	12	70
	20	14	003	29	087	46	59	13	70
	30	14	034	29	158	47	12	13	70
58	40	14	074	29	238	47	24	13	70
	50	14	113	29	317	47	36	13	71
	00	14	144	29	388	47	49	13	71
	10	14	184	29	468	48	01	13	71
	20	14	224	29	548	48	14	13	72
59	30	14	263	30	028	48	27	13	72
	40	14	294	30	108	48	40	13	72
	50	14	334	30	188	48	53	13	73
	00	14	374	30	269	48	06	13	73
	10	14	413	30	358	49	19	13	73
60	20	14	454	30	438	49	32	13	74
	30	14	484	30	518	49	45	13	74
	40	14	524	30	598	49	58	13	74
	50	14	564	31	078	50	11	14	75
	00	15	004	31	158	50	25	13	75

to find the difference of Longitudes.

Latit.		Fift		Sixt		Seventh		Eighth	
Gr.	m.	Long.	diff.	Long.	diff.	Long.	diff.	Long.	diff.
55	10	99	24 26	160	21 42	333	51 88	501	01 03
	20	99	50 27	161	03 43	335	23 89	502	01 02
	30	100	17 26	161	46 43	336	52 89	503	01 02
	40	100	43 27	162	29 43	338	21 89	504	01 01
	50	101	10 27	163	12 43	339	50 89	505	01 01
56	00	101	37 27	163	55 43	341	19 90	506	00 12
	10	102	04 27	164	38 43	342	49 91	507	01 01
	20	102	31 27	165	21 44	344	20 91	508	01 02
	30	102	58 27	166	05 44	345	51 91	509	01 02
	40	103	25 27	166	49 44	347	22 92	510	01 04
	50	103	52 27	167	33 45	348	54 92	511	01 02
57	00	104	19 27	168	18 44	350	26 93	512	00 12
	10	104	46 28	169	02 44	351	59 93	513	01 01
	20	105	14 28	169	46 45	353	32 93	514	01 02
	30	105	42 28	170	31 45	355	05 94	515	01 02
	40	105	10 28	171	16 45	356	39 94	516	01 04
	50	106	38 29	172	01 46	358	13 94	517	01 02
58	00	107	07 28	172	47 45	359	47 95	518	00 12
	10	107	35 28	173	32 46	361	22 96	519	01 01
	20	108	03 29	174	18 46	362	58 96	520	01 02
	30	108	32 28	175	04 46	364	34 97	521	01 02
	40	109	00 29	175	50 47	366	11 97	522	01 04
	50	109	29 29	176	37 47	367	48 97	523	01 02
59	00	109	58 29	177	24 47	369	25 98	524	00 12
	10	110	27 29	178	11 47	371	03 98	525	01 01
	20	110	56 30	178	58 48	372	41 99	526	01 02
	30	111	26 29	179	46 48	374	20 99	527	01 02
	40	111	55 30	180	34 48	375	59 100	528	01 02
	50	112	25 30	181	22 48	377	39 100	529	01 02
60	00	112	55 30	182	10 48	379	10 101	530	00 12

# The second Table of Rumb.

Latit.]		First		Second		Third		Fourth					
gr. m.	Long.	dis.	Long.	dis.	Long.	dis.	Long.	dis.					
60	10	15	04	4	31	24	8	50	38	13	78	47	2
	20	15	08	4	31	32	9	50	51	14	75	07	2
	30	15	12	4	31	41	8	51	05	14	76	27	2
	40	15	16	4	31	49	8	51	19	13	76	47	2
	50	15	20	5	31	57	8	51	33	14	77	08	2
61	00	15	25	4	32	05	9	51	47	13	77	29	2
	10	15	29	4	32	14	9	52	00	14	77	49	2
	20	15	33	4	32	23	9	52	14	14	78	10	2
	30	15	37	4	32	32	9	52	28	14	78	31	2
	40	15	41	5	32	41	8	52	42	14	78	52	2
	50	15	46	4	32	49	9	52	56	15	79	13	2
62	00	15	50	4	32	58	9	53	11	14	79	34	2
	10	15	54	4	33	07	9	53	25	14	79	55	2
	20	15	58	5	33	16	9	53	39	14	80	17	2
	30	16	03	4	33	25	9	53	53	15	80	39	2
	40	16	07	5	33	34	9	54	08	15	81	01	2
	50	16	12	4	33	43	9	54	23	15	81	23	2
63	00	16	16	4	33	52	9	54	38	14	81	45	2
	10	16	20	5	34	01	9	54	52	15	82	07	2
	20	16	25	4	34	10	9	55	07	15	82	29	2
	30	16	29	5	34	19	9	55	22	15	82	51	2
	40	16	34	4	34	28	10	55	37	15	83	13	2
	50	16	38	5	34	38	9	55	52	15	83	36	2
64	00	16	43	4	34	47	10	56	07	15	83	59	2
	10	16	47	5	34	57	10	56	22	15	84	22	2
	20	16	52	4	35	07	9	56	37	16	84	45	2
	30	16	56	5	35	16	10	56	53	16	85	08	2
	40	17	01	4	35	26	10	57	09	16	85	31	2
	50	17	05	5	35	36	9	57	25	16	85	54	2
65	00	17	10	5	35	45	10	57	41	15	86	18	2

# to find the difference of Longitudes.

Latit.		Fift		Sixt		Seventh	
yr.	m.	Long.	dis.	Long.	dis.	Long.	dis.
47	10	113 25	30	182 58	48	381 00	101
07	20	113 55	31	183 46	49	382 41	102
27	30	114 26	30	184 35	49	384 23	102
47	40	114 56	31	185 24	50	386 05	103
08	50	115 27	31	186 14	50	387 48	103
29	61	00 115 58	31	147 04	50	389 31	104
49	10	116 29	31	187 54	50	391 15	105
10	20	117 00	31	188 44	50	393 00	105
31	30	117 31	31	189 34	51	394 45	106
52	40	118 02	31	190 25	51	396 31	106
13	50	118 33	32	191 16	51	398 17	107
34	62	00 119 05	32	192 07	51	400 04	108
55	10	119 37	32	192 58	52	401 52	108
17	20	120 09	33	193 50	52	403 40	108
39	30	120 42	32	194 42	52	405 28	109
01	40	121 14	33	195 34	53	407 17	109
23	50	121 47	33	196 27	53	409 06	110
45	63	00 122 20	33	197 20	53	410 56	112
07	10	122 53	33	198 13	54	412 48	112
29	20	123 26	34	199 07	54	414 40	112
51	30	124 00	33	200 01	54	416 32	113
13	40	124 33	34	200 55	55	418 25	114
36	50	125 07	34	201 50	55	420 19	114
59	64	00 125 41	34	202 45	55	422 13	115
22	10	126 15	35	203 40	56	424 08	116
45	20	126 50	35	204 36	56	426 04	116
08	30	127 25	35	205 32	56	428 00	117
31	40	128 00	35	206 28	57	429 57	118
54	50	128 35	35	207 25	57	431 55	118
8	65	00 129 10	35	208 22	57	433 53	120

# The second Table of Rumbes and of

Latit.	First	Second	Third	Fourth
gr. m.	Long. dif.	Long. dif.	Long. dif.	Long. dif.
65	10 17 15 4	35 55 10	57 56 16	86 43 24
	20 17 19 5	36 05 10	58 12 16	87 06 24
	30 17 24 5	36 15 10	58 28 16	87 30 24
	40 17 29 5	36 25 10	58 44 16	87 54 24
	50 17 34 5	36 35 10	59 00 17	88 18 25
66	00 17 39 4	36 45 10	59 17 16	88 43 24
	10 17 43 5	36 55 11	59 33 16	89 07 25
	20 17 48 5	37 06 10	59 49 17	89 32 25
	30 17 53 5	37 16 10	60 06 17	89 57 25
	40 17 58 5	37 26 11	60 23 17	90 22 25
	50 18 03 5	37 37 11	60 40 18	90 47 26
67	00 18 08 5	37 48 10	60 58 17	91 13 26
	10 18 13 6	37 58 11	61 15 17	91 39 26
	20 18 19 5	38 09 11	61 32 17	92 05 26
	30 18 24 6	38 20 11	61 49 18	92 31 26
	40 18 30 5	38 31 11	62 07 18	92 57 26
	50 18 35 5	38 42 11	62 25 18	93 23 27
68	00 18 40 5	38 53 11	62 43 17	93 50 27
	10 18 45 6	39 04 11	63 00 18	94 17 27
	20 18 51 6	39 15 11	63 18 18	94 44 27
	30 18 57 5	39 26 12	63 36 18	95 11 27
	40 19 03 5	39 38 11	63 54 19	95 38 28
	50 19 07 6	39 49 11	64 13 19	96 06 28
69	00 19 13 5	40 00 12	64 32 18	96 34 28
	10 19 18 6	40 12 12	64 50 19	97 07 28
	20 19 24 5	40 24 11	65 09 19	97 30 28
	30 19 29 6	40 35 12	65 28 19	97 58 29
	40 19 35 6	40 47 11	65 47 19	98 27 29
	50 19 41 6	40 06 12	66 06 20	98 56 29
60	00 19 47 6	41 26 12	66 26 20	99 25 29

# to find the difference of Longitudes.

Latit. | Fifth | Sixth | Seventh

gr. m.	Long.	diff.	Long.	diff.	Long.	diff.
65	10 129 45	36	209 19	58	435 53	120
24	20 130 21	36	210 17	58	437 53	121
24	30 130 57	36	211 15	58	439 54	122
24	40 131 33	36	212 13	58	441 56	122
25	50 132 09	37	213 12	59	443 58	123
24	66 00 132 46	37	214 11	60	446 01	124
25	10 133 23	37	215 11	60	448 05	125
25	20 134 00	38	216 11	60	450 10	125
25	30 134 38	38	217 11	61	452 15	126
25	40 135 16	38	218 12	61	454 21	127
26	50 135 54	38	219 13	61	456 28	129
26	67 00 136 32	38	220 14	62	458 37	129
26	10 137 10	39	221 18	62	460 46	130
26	20 137 49	39	222 16	63	462 56	131
26	30 138 28	39	223 21	63	465 07	132
26	40 139 07	39	224 24	64	467 19	133
27	50 139 46	40	225 28	64	469 32	134
27	68 00 140 26	40	226 32	65	471 46	135
27	10 141 06	41	227 37	65	474 01	136
27	20 141 47	41	228 42	66	476 17	136
27	30 142 28	41	229 48	66	478 33	138
28	40 143 09	41	230 54	67	480 51	138
28	50 143 50	41	232 01	67	483 09	139
28	69 00 144 31	42	233 08	68	485 28	141
28	10 145 13	42	234 16	68	487 49	142
28	20 145 55	43	235 24	68	490 11	143
29	30 146 38	43	236 32	69	492 34	144
29	40 147 21	43	237 41	70	494 58	145
29	50 148 04	43	238 51	70	497 23	145
29	70 00 148 47	44	240 01	11	499 40	148

# The second Table of Rumbs.

Latit.		First		Second		Third		Fourth	
gr.	m.	Long.	diff.	Long.	diff.	Long.	diff.	Long.	diff.
70	10	19	53 6	41	23 12 66	45	19 99	54	30
	20	19	59 5	41	35 13 67	05	20 100	24	30
	30	20	04 6	41	48 12 67	25	20 100	54	30
	40	20	10 6	42	00 13 67	45	20 101	24	30
	50	20	16 6	42	13 12 68	05	21 101	54	31
71	00	20	22 6	42	25 13 68	26	20 102	25	31
	10	20	28 6	42	48 13 68	46	21 102	56	31
	20	20	34 7	42	51 13 69	07	21 103	27	31
	30	20	41 6	43	04 13 69	28	21 103	58	32
	40	20	47 6	43	17 13 69	49	21 104	30	32
72	50	20	53 7	43	30 14 70	10	22 105	02	32
	00	21	00 6	43	44 13 70	32	22 105	34	32
	10	21	06 6	43	57 13 70	54	22 106	06	33
	20	21	12 7	44	10 14 71	16	22 106	39	33
	30	21	19 7	44	24 14 71	38	22 107	12	34
73	40	21	26 7	44	38 14 71	00	23 107	46	34
	50	21	33 7	44	52 14 72	23	23 108	20	34
	00	21	40 6	45	06 14 72	46	23 108	54	34
	10	21	47 7	45	20 14 73	09	23 109	28	35
	20	21	53 7	45	34 15 73	32	23 110	03	35
74	30	22	00 7	45	49 15 73	55	24 110	38	35
	40	22	07 7	46	04 15 74	19	24 111	13	36
	50	22	14 7	46	19 15 74	43	24 111	49	36
	00	22	21 8	46	34 15 75	07	25 112	25	36
	10	22	29 7	46	49 15 75	32	24 113	01	37
75	20	22	36 8	47	04 16 75	56	25 113	38	38
	30	22	44 7	47	20 15 76	21	25 114	15	38
	40	22	51 8	47	35 16 76	46	25 114	53	38
	50	22	59 7	47	51 16 78	11	26 115	31	38
	00	23	06 8	48	07 16 78	27	26 116	09	38

to find the difference of Longitudes

Lat.		Fift		Sixt		Seventh	
gr.	m.	Long.	dif.	Long.	dif.	Long.	dif.
70	10	149 31 44		241 12 72		502 17 149	
	20	150 15 45		242 24 72		504 46 150	
	30	151 00 45		243 36 73		507 16 151	
	40	151 45 46		244 49 73		509 47 152	
	50	152 31 46		246 02 74		512 19 154	
71	00	153 17 46		247 16 74		514 52 155	
	10	154 03 46		248 30 75		517 28 156	
	20	154 49 47		249 45 76		520 04 158	
	30	155 36 48		251 01 76		522 42 159	
	40	156 24 48		252 17 77		525 21 161	
	50	157 12 48		253 34 78		528 02 162	
72	00	158 00 49		254 52 78		530 44 163	
	10	158 49 49		256 10 79		533 27 165	
	20	159 38 49		257 29 80		536 12 166	
	30	160 27 50		258 49 81		538 58 168	
	40	161 17 50		260 10 82		541 46 170	
	50	162 07 51		261 32 82		544 36 171	
73	00	162 58 51		262 54 83		547 27 173	
	10	163 49 52		264 17 84		550 20 174	
	20	164 41 53		265 41 84		553 14 176	
	30	165 34 53		267 05 85		556 10 178	
	40	166 27 54		268 35 85		559 08 180	
	50	167 21 54		269 56 87		562 08 181	
74	00	168 15 55		271 23 88		565 09 183	
	10	169 10 55		272 51 89		568 12 185	
	20	169 55 55		274 20 90		571 17 187	
	30	171 00 56		275 50 91		574 24 189	
	40	171 56 57		277 21 92		577 33 191	
	50	172 53 57		278 53 93		580 44 194	
75	00	173 50 58		280 26 94		583 58 196	

Suns declination 1665, 1669, 1673, 1677.

Days	Janua		Febru		Mar		April		May		June	
	South		South		South		North		North		North	
1	22	43	13	44	3	31	8	39	18	8	22	13
2	21	33	13	24	2	57	9	1	18	23	23	17
3	21	23	13	4	2	34	9	23	18	37	23	20
4	21	12	12	43	2	10	9	44	18	52	23	23
5	20	1	12	22	1	46	10	6	19	06	23	26
6	20	49	12	1	1	23	10	27	19	20	23	28
7	20	37	11	40	0	59	10	43	19	33	23	29
8	20	24	11	19	0	35	11	9	19	46	23	31
9	19	11	10	57	0N	12	11	30	19	59	23	31
10	19	58	10	36	0	12	11	50	20	12	23	32
11	18	45	10	14	0	36	12	10	20	24	23	32
12	19	31	9	53	1	0	12	30	20	36	23	31
13	19	16	9	30	1	23	12	50	20	47	23	31
14	19	1	9	7	1	47	13	9	20	58	23	30
15	18	46	8	45	2	10	13	29	21	9	23	28
16	18	31	8	22	2	34	13	49	21	19	23	26
17	18	15	8	0	2	57	14	8	21	29	23	25
18	17	59	7	37	3	21	14	26	21	39	23	21
19	17	43	7	14	3	44	14	45	21	48	23	17
20	17	26	6	51	4	7	15	3	21	57	23	14
21	17	10	6	28	4	30	15	21	22	5	23	10
22	16	52	6	5	4	54	15	39	22	13	23	5
23	16	35	5	42	5	17	15	57	22	21	23	0
24	16	17	5	18	5	40	16	14	22	28	22	55
25	15	50	4	55	6	3	16	31	22	35	22	49
26	15	40	4	32	6	25	16	48	22	42	22	43
27	15	22	4	8	6	48	17	5	22	48	22	37
28	15	03	3	45	7	11	17	21	22	54	22	30
29	16	43			7	33	17	27	22	59	22	23
30	16	24			7	55	17	52	23	4	22	15
31	16	4			8	17		23	9			

Suns declination 1665, 1669, 1673, 1677.

☾	July.	Augu.	Septē.	Octob.	Novē.	Decem.
☾	North	North	North	South	South	South
1	22 07 15	10 4 32	7 17 17	42 13 10		
2	21 59 14	52 3 58	7 40 17	58 23 14		
3	21 50 14	34 3 36	8 3 18	14 23 18		
4	21 41 14	15 3 12	8 25 18	30 23 21		
5	21 32 13	56 2 49	8 48 18	45 23 24		
6	21 23 13	37 2 26	9 10 19	0 23 27		
7	21 11 13	18 2 2	9 32 19	15 23 29		
8	21 01 12	59 1 39	9 54 19	29 23 30		
9	20 50 12	39 1 16	10 16 19	43 23 31		
10	20 39 12	19 0 52	10 37 19	57 23 32		
11	20 27 11	59 0 29	10 59 20	10 23 32		
12	20 15 11	39 0 5	11 20 20	23 23 32		
13	20 3 11	19 0 5	11 41 20	35 23 31		
14	19 50 10	58 0 42	12 2 20	48 23 29		
15	19 37 10	37 1 5	12 23 20	59 23 28		
16	19 24 10	16 1 29	12 44 21	10 23 26		
17	19 10 9	55 1 52	13 4 21	21 23 23		
18	18 56 9	34 2 16	13 24 21	32 23 19		
19	18 42 9	12 2 39	13 44 21	42 23 16		
20	18 27 8	51 3 3	14 4 21	52 23 11		
21	18 12 8	29 3 26	14 24 22	1 23 7		
22	17 57 8	7 3 49	14 43 22	10 23 2		
23	17 42 7	45 4 13	15 2 22	18 22 56		
24	17 26 7	23 4 36	15 21 22	26 22 50		
25	17 10 7	1 4 59	15 40 22	34 22 44		
26	16 54 6	38 5 23	15 58 22	41 22 37		
27	16 37 6	16 5 46	16 16 22	47 22 30		
28	16 20 5	53 6 9	16 34 22	54 22 22		
29	16 3 5	30 6 32	16 51 22	59 22 13		
30	15 46 5	8 6 54	17 8 23	5 22 5		
31	15 28 4	45 4 17	25 17 25	21 22 56		

Suns declination 1666, 1670, 1674, 1678.

Days.	Janua.	Februa.	Mar.	April	May	June
	South	South	South	North	North	North
1	21 46	13 49	03 27	08 34	18 04	23 11
2	21 36	13 29	03 30	08 56	18 19	23 16
3	21 26	13 9	02 40	09 17	18 34	23 19
4	21 15	12 48	02 16	09 39	18 49	23 22
5	21 4	12 27	01 52	10 1	19 03	23 25
6	20 52	12 6	01 29	10 32	19 17	23 27
7	20 40	11 45	01 5	10 43	19 30	23 29
8	20 27	11 24	00 41	11 4	19 43	23 30
9	20 14	11 2	00 18	11 25	19 56	23 31
10	20 1	10 41	00 6	11 45	20 09	23 32
11	19 48	10 19	00 30	12 05	20 21	23 32
12	19 34	09 57	00 54	12 26	20 33	23 32
13	19 19	09 35	01 18	12 46	20 44	23 31
14	19 5	09 13	01 41	13 05	20 56	23 30
15	18 50	08 51	02 5	13 25	21 7	23 28
16	18 35	08 28	02 29	13 44	21 17	23 27
17	18 19	08 6	03 52	14 03	21 27	23 25
18	18 3	07 43	03 16	14 22	21 37	23 22
19	17 47	07 20	03 39	14 41	21 46	23 18
20	17 30	06 57	04 2	14 59	21 55	23 15
21	17 14	06 34	04 25	15 17	22 03	23 11
22	16 56	06 11	04 48	15 35	22 11	23 06
23	16 39	05 48	05 11	15 53	22 19	23 01
24	16 21	05 24	05 34	16 10	22 27	23 56
25	16 7	05 1	05 57	16 27	22 34	23 50
26	15 44	04 38	06 19	16 44	22 40	23 44
27	15 26	04 14	06 42	17 01	22 46	23 38
28	15 7	03 51	07 5	17 17	22 52	23 31
29	14 48		07 27	17 33	22 58	23 24
30	14 28		07 49	17 49	23 03	23 17
31	14 9		08 11		23 08	

Suns declination 1666, 1670, 1674, 1678.

Days	July.	Aug.	Sept.	Oct.	Nov.	Decem.
	North	North	North	South	South	South
1	22	09	15	13	4	27
2	22	01	14	16	4	3
3	21	52	14	38	3	41
4	21	43	14	19	3	17
5	21	34	14	1	2	55
6	21	24	13	42	2	33
7	21	14	13	23	2	8
8	21	04	13	3	1	45
9	20	53	12	43	1	22
10	20	42	12	23	0	58
11	20	30	12	13	0	35
12	20	18	11	43	0	11
13	20	6	11	23	0	5
14	19	53	11	3	0	36
15	19	40	10	42	1	0
16	19	27	10	21	1	23
17	19	14	10	1	1	47
18	19	0	9	39	2	10
19	18	45	9	17	2	34
20	18	31	8	56	2	57
21	18	16	8	34	3	21
22	18	1	8	12	3	34
23	17	46	7	50	4	8
24	17	30	7	28	4	31
25	17	14	7	6	4	54
26	16	58	6	43	5	17
27	16	41	6	21	5	40
28	16	24	5	58	6	4
29	16	7	5	35	6	27
30	15	50	5	13	6	49
31	15	32	4	50		17

Suns declination 1667, 1671, 1673, 1679.

Janua		Februa.		Mar.		April		May		June	
South		South		South		North		North		North	
1	21	48	13	54	03	33	08	29	18	0	23
2	21	38	13	54	03	9	08	31	18	15	23
3	21	28	13	54	02	45	09	12	18	30	23
4	21	18	12	53	02	21	09	34	18	45	23
5	21	7	12	53	01	58	19	56	18	59	23
6	20	55	12	52	01	34	10	17	19	13	23
7	20	43	11	51	01	10	10	38	19	27	23
8	20	31	11	50	00	47	10	59	19	40	23
9	20	18	11	50	00	23	11	20	19	53	23
10	20	5	10	49	00	N 01	11	40	20	6	23
11	19	51	10	49	00	124	12	00	20	128	23
12	19	39	10	49	00	148	12	21	20	30	23
13	19	23	09	48	01	112	12	41	20	41	23
14	19	9	09	48	01	135	13	00	20	53	23
15	18	54	08	48	01	59	13	20	21	04	23
16	18	39	08	48	02	123	13	39	21	14	23
17	18	23	08	48	02	146	13	58	21	24	23
18	18	7	07	47	03	110	14	17	21	34	23
19	17	51	07	47	03	133	14	36	21	44	23
20	17	35	07	47	03	156	14	55	21	53	23
21	17	18	06	46	04	119	15	13	22	1	23
22	17	1	06	46	04	143	15	31	22	9	23
23	16	43	05	45	05	106	15	49	22	17	23
24	16	27	05	45	05	129	16	06	22	25	23
25	16	10	05	45	05	152	16	23	22	32	23
26	15	49	04	43	06	114	16	40	22	39	23
27	15	31	04	43	06	137	16	57	22	46	23
28	15	12	03	42	07	100	17	13	22	51	23
29	14	53		41	07	122	17	29	22	57	23
30	14	33		40	07	144	17	45	23	02	23
31	14	14		39	08	166		23	23	07	23

Suns declination 1667, 1671, 1675, 1679.

1667	July.		Augu.		Septē.		Octob.		Novē.		Decem	
	North	North	North	North	North	North	South	South	South	South	South	South
11	12	11	15	16	4	33	7	06	17	30	23	07
15	22	03	15	01	4	10	7	29	17	50	23	11
18	31	54	14	43	3	47	7	52	18	61	23	19
21	42	45	14	24	3	23	8	14	18	22	23	20
24	52	36	14	06	3	00	8	27	18	38	23	23
27	62	26	13	47	2	37	8	59	18	53	23	26
29	72	16	13	27	2	14	9	21	19	82	23	28
30	82	06	13	07	1	50	9	43	19	22	23	29
31	92	55	12	48	1	27	10	05	19	36	23	31
32	102	44	12	29	1	03	10	27	19	50	23	32
34	112	33	12	09	0	40	10	38	20	42	23	32
35	122	21	11	49	0	17	11	10	20	16	23	32
36	132	09	11	28	0	50	11	31	20	29	23	31
38	1419	56	11	08	0	30	11	52	20	42	23	30
40	1519	43	10	47	0	04	12	13	20	53	23	29
42	1619	30	10	26	1	17	12	34	21	52	23	27
44	1719	17	10	05	1	41	12	54	21	16	23	24
46	1819	03	9	44	2	04	13	14	21	27	23	21
48	1918	49	9	23	2	28	13	34	21	37	23	17
50	2018	34	9	01	2	51	13	54	21	47	23	14
52	2118	20	8	39	3	15	14	14	21	57	23	09
54	2218	05	8	17	3	38	14	33	22	62	23	04
56	2317	49	7	55	4	02	14	53	22	14	22	59
58	2417	34	7	33	4	25	15	12	22	22	22	53
60	2517	18	7	11	4	48	15	30	22	30	22	47
62	2617	01	6	49	5	11	15	49	22	37	22	40
64	2716	45	6	16	5	34	16	7	22	44	22	33
66	2816	29	6	04	5	58	16	24	22	51	22	25
68	2916	11	5	41	6	21	16	43	22	57	22	17
70	3015	54	5	18	6	44	17	02	23	22	22	06
72	3115	37	4	55			17	17		22	22	00

K

Suns declination 1664, 1668, 1672, 1667.

Lat.	Janua.	Februa.	Mar.	April	May	June
	South	South	South	North	North	North
1	21 51 13	59 03	15 38	45 18	12 13	14
2	21 41 13	39 02	51 09	7 18	27 23	18
3	21 31 13	19 02	27 09	29 18	42 23	21
4	21 20 12	58 02	4 29	50 18	56 23	24
5	21 9 12	38 01	40 10	11 19	10 23	26
6	20 58 12	17 01	16 10	33 19	23 23	28
7	20 46 11	56 00	52 10	54 19	37 23	30
8	20 34 11	34 00	29 11	15 19	50 23	31
9	20 21 11	13 00	05 11	35 20	3 23	32
10	20 8 10	51 00 N	19 11	55 20	15 23	32
11	19 55 10	30 00	43 12	16 20	27 23	32
12	19 41 10	8 01	06 12	36 20	39 23	31
13	19 27 09	46 01	30 12	56 20	50 23	30
14	19 13 09	24 01	53 13	15 21	1 23	29
15	18 58 09	1 02	17 13	35 21	11 23	27
16	18 43 08	39 02	41 13	54 21	22 23	25
17	18 28 08	17 03	04 14	15 21	32 23	23
18	18 17 07	54 03	27 14	32 21	41 23	20
19	17 55 07	31 03	51 14	50 21	50 23	16
20	17 39 07	9 04	14 15	8 21	59 23	13
21	17 22 06	45 04	37 15	36 22	8 23	9
22	17 5 06	22 05	00 15	44 22	16 23	4
23	16 47 05	59 05	23 16	2 22	23 22	59
24	16 30 05	35 05	46 16	19 22	30 22	43
25	16 12 05	12 06	09 16	26 22	37 22	48
26	15 53 04	49 06	31 16	53 22	44 22	42
27	15 35 04	25 06	54 17	9 22	50 22	35
28	15 16 04	1 07	17 17	25 22	55 22	28
29	14 57 03	38 07	39 17	41 23	0 22	21
30	14 38	08	11 17	57 23	5 22	13
31	14 19	08	23	23	10	

Suns declination 1664, 1668, 1672, 1676.

July		Aug.		Septē		Octob.		Novē		Decem	
North		North		North		South		South		South	
1	21 05 15	06 04 15	7	23 17	46 23	10					
2	21 56 14	47 03 52	7	46 18	03 23	15					
3	21 48 14	29 03 29	8	09 18	18 23	19					
4	21 38 14	10 03 06	8	31 18	34 23	22					
5	21 29 13	51 02 42	8	54 18	49 23	25					
6	21 19 13	32 2 19	9	16 19	04 23	27					
7	21 08 13	12 1 56	9	38 19	19 23	29					
8	20 58 12	53 1 32	10	00 19	33 23	30					
9	20 47 12	32 1 09	10	22 19	47 23	31					
10	20 35 12	14 0 46	10	43 20	00 23	32					
11	20 24 11	53 0 S 22	11	05 20	3 23	32					
12	20 12 11	33 0 01	11	26 20	26 23	31					
13	19 59 11	12 0 25	11	47 20	39 23	30					
14	19 47 10	52 0 48	12	08 20	51 23	29					
15	19 33 10	31 1 12	12	29 21	02 23	27					
16	19 20 10	10 1 36	12	49 21	13 23	25					
17	19 06 9	49 1 59	13	09 21	24 23	21					
18	18 52 9	28 2 22	13	30 21	35 23	18					
19	18 38 9	06 2 46	13	50 21	45 23	15					
20	18 22 8	04 3 9	14	10 21	54 23	10					
21	18 08 8	03 3 32	14	39 22	3 23	05					
22	17 53 8	01 3 56	14	48 22	12 23	00					
23	17 37 7	39 4 19	15	07 22	20 22	54					
24	17 22 7	17 4 42	15	26 22	28 22	48					
25	17 05 6	54 5 06	15	44 22	36 22	42					
26	16 49 6	32 5 29	16	03 22	43 22	35					
27	16 32 6	09 5 52	16	21 22	49 22	27					
28	16 16 5	47 6 15	16	3 22	55 22	19					
29	15 58 5	24 6 38	16	56 23	01 22	11					
30	15 41 5	01 7 01	17	13 23	06 22	02					
31	15 23 4	38 17 30			21 21	52					

# Suns Right Ascension in Hours and Minutes.

Days.	Janua		Febru		Mar.		April.		May.		June.	
	H	M	H	M	H	M	H	M	H	M	H	M
1	19	33	21	41	23	27	1	20	3	13	5	18
2	19	37	21	45	23	31	1	23	3	17	5	22
3	19	41	21	49	23	34	1	27	3	21	5	26
4	19	45	21	53	23	38	1	31	3	24	5	30
5	19	50	21	57	23	42	1	34	3	28	5	34
6	19	54	22	00	23	45	1	38	3	32	5	38
7	19	58	22	04	23	49	1	42	3	36	5	42
8	20	03	22	08	23	52	1	45	3	40	5	46
9	20	07	22	15	23	56	1	49	3	44	5	50
10	20	11	22	16	00	00	1	53	3	48	5	54
11	20	15	22	20	0	03	1	57	3	52	5	58
12	20	20	22	24	0	07	2	00	3	56	6	02
13	20	24	22	27	0	11	2	04	4	00	6	06
14	20	28	22	31	0	14	2	08	4	04	6	10
15	20	32	22	35	0	18	2	11	4	08	6	14
16	20	36	22	39	0	21	2	15	4	12	6	18
17	20	40	22	42	0	25	2	19	4	16	6	22
18	20	45	22	46	0	29	2	23	4	20	6	26
19	20	49	22	50	0	32	2	27	4	24	6	30
20	20	53	22	54	0	36	2	30	4	28	6	34
21	20	57	22	57	0	40	2	34	4	33	6	38
22	21	01	23	01	0	43	2	38	4	37	6	42
23	21	05	23	05	0	47	2	42	4	41	6	46
24	21	09	23	08	0	50	2	46	4	45	6	50
25	21	13	23	12	0	54	2	49	4	49	6	54
26	21	17	23	16	0	58	2	53	4	53	7	02
27	21	21	23	20	1	01	2	57	4	57	7	06
28	21	25	23	23	1	05	3	01	5	01	7	10
29	21	29			1	09	3	05	5	05	7	14
30	21	33			1	12	3	09	5	10	7	18
31	22	73			1	16			5	14		

# Suns Right Ascension in Hours and Minutes.

Days	July		Augu		Septe.		Octob.		Nove.		Decem	
	H	M	H	M	H	M	H	M	H	M	H	M
1	07	22	09	24	11	18	13	06	15	06	17	14
2	07	26	09	28	11	21	13	10	15	10	17	19
3	07	30	09	31	11	25	13	14	15	14	17	23
4	07	34	09	35	11	29	13	17	15	18	17	27
5	07	38	09	39	11	32	13	21	15	23	17	32
6	07	42	09	43	11	36	13	25	15	27	17	36
7	07	46	09	46	11	39	13	29	15	32	17	41
8	07	50	09	50	11	43	13	32	15	35	17	45
9	07	54	09	54	11	47	13	36	15	39	17	50
10	07	58	09	58	11	50	13	40	15	43	17	54
11	08	02	10	01	11	54	13	44	15	48	17	59
12	03	06	10	05	11	57	13	48	15	52	18	03
13	08	10	10	09	12	01	13	51	15	56	18	07
14	08	14	10	12	12	04	13	55	16	00	18	12
15	08	18	10	16	12	08	13	59	16	05	18	16
16	08	22	10	20	12	12	14	03	16	09	18	21
17	08	26	10	23	12	15	14	07	16	13	18	25
18	08	30	10	27	12	19	14	11	16	17	18	30
19	08	34	10	31	12	23	14	14	16	22	18	34
20	08	38	10	34	12	26	14	18	16	26	18	09
21	03	42	10	38	12	30	14	22	16	30	18	43
22	08	46	10	42	12	33	14	26	16	35	18	48
23	08	49	10	45	12	37	14	30	16	39	18	52
24	08	53	10	49	12	41	14	34	16	43	18	56
25	08	57	10	53	12	44	14	38	16	48	19	01
26	09	01	10	56	12	48	14	42	16	52	19	05
27	09	05	11	00	12	52	14	46	16	56	19	10
28	09	09	11	03	12	55	14	50	17	01	19	14
29	09	13	11	07	12	59	14	54	17	05	19	18
30	09	16	11	11	13	03	14	58	17	10	19	23
31	09	20	11	14		15	02			19	27	

*The Declination and right Ascension of the Stars  
calculated for 20 years yet to come.*

NAMES.	Right Ascension.		Declination.		distan. from po D.
	H.	M.	D.	M.	
Bulls eye	4	10	15	48	N 74
Arcturus	14	01	20	58	N 69
Lyra	18	25	38	30	N 51
Medusa's head <i>Algol</i>	2	47	39	39	N 50
The Goat <i>Capella</i>	4	52	45	37	N 44
Lions heart <i>Regulus</i>	9	39	13	33	N 76
Lions tale	11	32	16	25	N 73
Virgins Spike	13	04	9	31	S 80
Scorpions heart	16	09	25	37	S 64
Fomahant	22	39	37	17	S 52
Left foot of Orion	04	59	08	37	S 81
1 in Orions Girdle	05	03	0	35	S 89
2 in Orions Girdle	05	19	01	26	S 88
3 in Orions Girdle	05	24	02	09	S 87
Great dog Sirius	06	31	16	14	S 73
Little dog Procyon	07	22	06	03	N 83
Hydra's heart	09	11	07	15	S 82
Breast of Cassiopea	00	22	54	45	N 35
Girdle of Andromeda	00	51	33	55	N 56
Whales belly	01	35	11	54	S 78
Hydra's head	08	21	4	30	N 85
Pegasus mouth	21	28	8	24	N 81
Pegasus shoulder	23	59	13	22	N 76
Head of Andromeda	23	39	27	18	N 62
Perseus right side	09	57	48	36	N 41
In the Whales Chap	02	45	2	48	N 87

Whal

ales tale	00	27	19	48	S	70	12
ons left shoulder	05	4	6	1	N	83	59
e forefoot of great dog	06	08	17	49	S	72	15
e-star	00	31	87	33	N	2	27
e uppermost in the	14	39	75	36	N	14	24
quare of the little Bear.							
ft in great Bears tale	12	39	75	47	N	14	13
ight star of the Crown	15	20	27	51	N	62	9
rcules left knee	17	44	37	21	N	52	39
ans tail	20	28	44	05	N	45	55
pentinus head	17	20	12	52	N	77	8
ight foot of the twins	06	18	16	38	N	73	22
ons neck	10	01	21	29	N	68	31
uth ballance	14	32	14	37	S	75	23
orth ballance	15	0	08	07	S	81	53

### Questions of Navigation.

*Question 1.* By the rumb and distance of two places, to find the difference of latitude.

*the Radius is*

*the sine of the compl. of the rumb from the merid.*

*is the distance*

*the difference of latitude.*

*Examp.* If a ship sail West North-west (that is up-  
the sixth rumb from the merid.) the distance 90  
agues: what shall be the difference of latitude?

First, I see in the Table foregoing that the angle  
which that rumb maketh with the meridian is 67 deg.  
30 min. the complement whereof is 22 deg. 30 m.  
whose sine is 38268. Therefore

100000 is to 38268

So is 90 to 34<sup>04</sup> leagues to the difference of latitude,  
which

# A Table of Amplitudes for these deg. of Latitudes.

Decl.	Sums	30		32		34		36		38		40		42		44		
		D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	
0		0	00	0	00	0	00	0	00	0	00	0	00	0	00	0	00	
1		1	9	1	10	1	12	1	14	1	16	1	18	1	21	1	21	
2		2	18	2	21	2	25	2	29	2	32	2	36	2	41	2	41	
3		3	28	3	33	3	38	3	44	3	49	3	55	4	2	4	2	
4		4	37	4	44	4	50	4	58	5	3	5	13	5	23	5	23	
5		5	46	5	54	6	2	6	11	6	21	6	32	6	44	6	58	
6		6	56	7	3	7	14	7	25	7	37	7	50	8	5	8	2	
7		8	6	8	16	8	27	8	40	8	54	9	9	9	26	9	45	
8		9	15	9	27	9	39	9	54	10	10	10	28	10	47	11	9	
9		10	24	10	39	10	52	11	00	11	27	11	47	12	9	12	34	
10		11	34	11	48	12	5	12	24	12	43	13	6	13	31	13	58	
11		12	44	13	00	13	18	13	39	14	00	14	25	14	53	15	2	
12		13	53	14	11	14	32	14	54	15	18	15	44	16	16	16	4	
13		15	3	15	23	15	45	16	9	16	35	17	4	17	38	18	1	
14		16	12	16	35	16	59	17	24	17	52	18	24	19	00	19	3	
15		17	22	17	46	18	12	18	40	19	10	19	45	20	23	21	5	
16		18	32	18	58	19	16	19	55	20	28	21	5	21	46	22	3	
17		19	43	20	10	20	39	21	11	21	47	22	26	23	10	23	5	
18		20	54	21	22	21	53	22	27	23	5	23	47	24	34	25	2	
19		22	5	23	25	23	7	23	44	24	24	25	9	25	59	26	5	
20		23	16	23	47	24	22	25	00	25	43	26	31	27	24	28	2	
21		24	26	25	00	25	37	26	17	27	3	27	53	28	50	29	5	
22		25	38	26	13	26	52	27	35	28	23	29	16	30	13	31	2	
23		26	49	27	26	28	7	28	53	29	44	30	40	31	46	32	5	
23		31	27	25	28	3	28	45	29	32	30	25	31	22	32	27	33	4

the East, and set 31 Degrees 10 Minutes to the Northward of the West: But if the Declination had been 1 Degrees South, then they would have risen 31 Degrees 10 Minutes to the Southward of the East, and set 3 Degrees 10 Minutes to the Southward of the West.

Look for  
Declination  
angle of  
In the  
10 min. N  
Answer  
at Sun-ris  
the declin  
Look above said

# A Table of Amplitudes for these deg. of Latitudes.

Suns Declination.	45		46		47		48		49		50		51		52	
	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.
0	0	00	0	00	0	00	0	00	0	00	0	00	0	00	0	00
1	1	25	1	26	1	28	1	29	1	31	1	33	1	35	1	37
2	2	50	2	53	2	56	2	59	3	3	3	6	3	10	3	15
3	4	15	4	16	4	24	4	29	4	34	4	40	4	46	4	52
4	5	40	5	45	5	52	5	59	6	6	6	14	6	22	6	30
5	7	5	7	12	7	21	7	29	7	38	7	48	7	58	8	8
6	8	30	8	38	8	49	8	59	9	10	9	22	9	34	9	46
7	9	56	10	6	10	18	10	30	10	42	10	56	11	10	11	25
8	11	21	11	33	11	47	12	00	12	14	12	31	12	47	13	4
9	12	47	13	1	13	16	13	31	13	48	14	5	14	24	14	43
10	14	13	14	27	14	45	15	2	15	21	15	40	16	1	16	23
11	15	39	15	55	16	15	16	34	16	54	17	16	17	39	18	3
12	17	6	17	25	17	45	18	6	18	28	18	52	19	18	19	44
13	18	33	18	54	19	16	19	39	20	3	20	29	20	58	21	26
14	20	05	20	23	20	47	21	12	21	38	22	6	22	38	23	8
15	21	28	21	53	22	18	22	45	23	14	23	44	24	17	24	51
16	22	56	23	23	23	50	24	20	24	51	25	23	25	59	26	36
17	24	25	24	53	25	23	25	55	26	28	27	3	27	41	28	21
18	25	55	26	25	26	57	27	31	28	6	28	44	29	25	30	8
19	27	25	27	57	28	32	29	7	29	45	30	26	31	9	31	56
20	28	56	29	30	30	7	30	45	31	25	32	9	32	55	33	46
21	30	27	31	03	31	42	32	23	33	6	33	53	34	48	35	36
22	32	00	32	37	33	19	34	3	34	48	35	40	36	32	37	29
23	33	32	34	13	34	57	35	43	36	34	37	26	38	23	39	24
24	34	20	35	2	35	48	36	34	37	26	38	20	39	20	40	21

Look for your Latitude in the head of the Table, and the declination in the first Column on the left hand, and in the common angle of meeting, you will find Amplitude desired.

In the Latitude of 30 deg. the Suns declination being 7 deg. 30 min. North, I demand the Amplitude.

*Answer,* The Amplitude is 8 d. 6 m. from the East Northward, at Sun-rising, or from the West Northward at Sun setting: But if the declination had been 7 d. 00 m. South, in Latitude 30 d. as above said, then the Amplitude would have been 8 d. 6 m. from the

# A Table of Amplitudes for these deg. of Latitudes

Decl.	Sun	53		54		55		56		57		58		59		60	
		D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.	D.	M.
0	0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
1	1	39	1	42	1	45	1	47	1	50	1	53	1	56	2	0	0
2	2	20	3	24	3	29	3	34	3	40	3	46	3	53	4	0	0
3	3	59	5	6	5	14	5	22	5	31	5	40	5	50	6	0	0
4	4	39	6	49	6	59	7	10	7	22	7	34	7	47	8	1	1
5	5	19	8	32	8	45	8	58	9	14	9	28	9	45	10	2	2
6	6	10	10	15	10	30	10	47	11	4	11	23	11	43	12	4	4
7	7	41	11	58	12	16	12	35	12	56	13	18	13	41	14	6	6
8	8	13	13	41	14	2	14	24	14	48	15	14	15	41	16	1	1
9	9	15	15	26	16	48	16	15	16	42	17	10	17	41	18	1	1
10	10	16	17	11	17	37	18	6	18	36	19	8	19	42	20	1	1
11	11	18	18	57	19	26	19	57	20	31	21	6	21	45	22	2	2
12	12	20	20	43	21	15	21	50	22	26	23	6	23	49	24	3	3
13	13	21	22	30	23	5	23	43	24	23	25	7	25	59	26	4	4
14	14	23	24	18	24	57	25	38	26	22	27	10	28	1	28	5	5
15	15	25	26	7	26	49	27	34	28	22	29	14	30	10	31	1	1
16	16	27	27	58	28	43	29	32	30	24	31	21	32	22	33	2	2
17	17	29	29	50	30	39	31	31	32	28	33	29	34	35	35	4	4
18	18	30	31	44	32	36	33	33	34	34	35	40	36	52	38	1	1
19	19	32	33	28	34	35	35	36	36	43	37	54	39	13	40	3	3
20	20	34	35	35	36	36	37	42	38	53	40	12	41	37	43	1	1
21	21	36	37	33	38	40	39	51	41	9	42	34	44	40	45	4	4
22	22	38	39	37	40	46	42	4	43	27	44	59	46	40	48	3	3
23	23	40	41	40	42	56	44	20	45	50	47	30	49	21	51	2	2
24	24	41	42	43	44	2	45	30	47	02	48	49	50	44	52	5	5

the East Southward at Sun rising; and 3 d. 6 m. from the West Southward at Sun setting; for if the declination be North, the true Amplitude will always be to the Northwards of the East or West: But if the declination be South, the true Amplitude will always be to the Southwards of the East or West.

If you have any odd minutes of declination, you must take the proportional part.

In the Latitude of 42 d. 30 m. the Sun's declination being 12 d. 15 m. I demand the Amplitude.

Answer, The Amplitude is 16 deg. 43 min.

